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SCHOOL OF
DENTAL MEDICINE

AMERICAN

MEDICINAL PLANTS;

AN

Illustrated and Descriptive Guide

TO

THE AMERICAN PLANTS USED AS HOMŒOPATHIC REMEDIES:

Their History, Preparation, Chemistry, and
Physiological Effects.

BY

CHARLES F. MILLSPAUGH, M.D.

ILLUSTRATED BY THE AUTHOR.

VOL. II.

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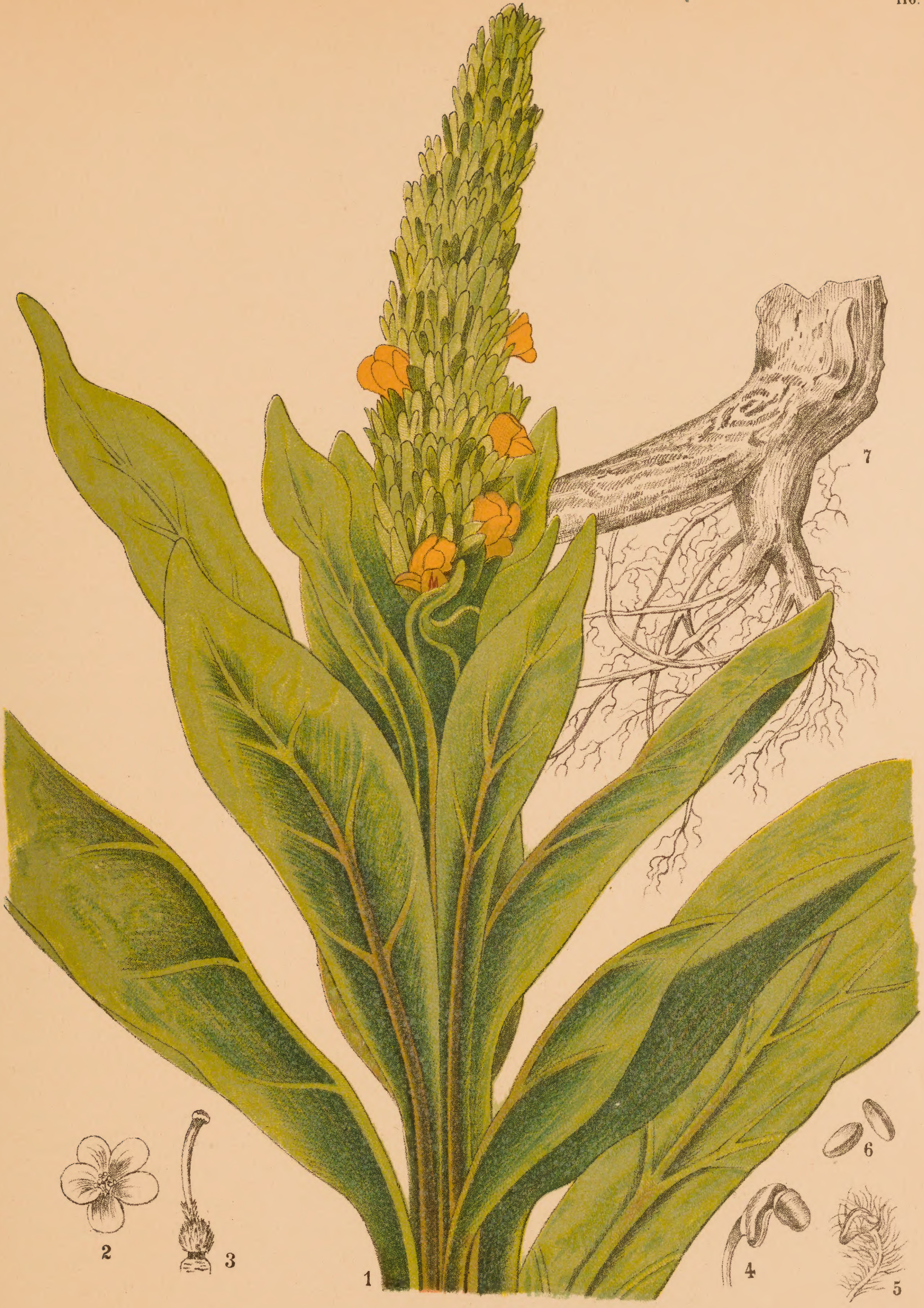

F.M. ad nat del. et pinxt.

VERBÁSCUM THÁPSUS, Linn.

Tribe.—VERBASCEÆ.

GENUS.—**VERBASCUM**,* LINN.

SEX. SYST.—PENTANDRIA MONOGYNIA.

VERBASCUM.

MULLEIN.

SYN.—VERBASCUM THAPSUS, LINN.; TAPSUS BARBATUS, GER.

COM. NAMES.—COMMON MULLEIN; HIGH TAPER; COW'S LUNG WORT; FLANNEL PLANT; (FR.) MOLÈNE, BOUILLON-BLANC; (GER.) KÖNIGSKERZE, WOLLKRAUT.

A TINCTURE OF THE WHOLE FRESH HERB, VERBASCUM THAPSUS, LINN.

Description.—This densely woolly, pale green biennial weed, grows to a height of from 3 to 6 feet or more. *Stem* stout, simple, and very straight; *leaves* alternate, crowded, oblong, acute, entire or nearly so, and so far decurrent at the base that the stem appears winged. *Inflorescence* a simple, dense, terminal, cylindrical spike, from 1 to 2 feet in length. *Flowers* ephemeral, closing during sunshine. *Calyx* 5-parted; *lobes* lanceolate, acute. *Corolla* open or concave, somewhat rotate, the tube scarcely apparent; *lobes* 5, broad, acute, nearly equal. *Stamens* 5; *filaments* curved, the lower two longest and naked, the lateral pair longer than the upper one, and the latter three bearded; *anthers* 5, 1-celled by confluence. *Style* cylindrical, curved; *stigma* capitate, or merely a stigmatose dilation of the apex of the style. *Pod* globular, septicidally 2-valved; *valves* 2-cleft; *seeds* numerous, wrinkled.

Scrophulariaceæ.—This large family of herbs, or rarely small shrubs and trees, is noted for its many narcotic-poisonous species. In its general character it bears some resemblance to the Labiateæ, but is separated from that order by many intervening families. It is characterized as follows: *Leaves* either opposite or alternate, sometimes whorled; *stipules* none. *Inflorescence* various; *primary* centripetal; *secondary* centrifugal when present; *flowers* perfect, more or less irregular and bilabiate; *calyx* and *corolla* 5-merous, the former persistent, the latter personate; sometimes, however, they are 4-merous, but all four stamens are not always present, and in one genus (*Synthyris*) the corolla is entirely wanting. *Stamens* didynamous or diandrous, rarely 5 and perfect (*Verbascum*), when any are abortive it is usually the superior one; *filaments* inserted upon the tube of the corolla. *Ovary* 2-celled; *placentæ* axial; *ovules* several to numerous, rarely one, anatropous or amphitropous; *style* single and undivided; *stigma* usually entire, sometimes 2-lobed or 2-lipped. *Fruit* generally capsular, 2-celled. *Seeds* small, rarely winged; *embryo* usually small and straight; *albumen* copious, sarcous.

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* Altered from *Barbascum*, the old Latin name, signifying the bearded pubescence.

Beside the six genera represented in this work, we have provings of two important members of this Order, viz.: the European Fox-glove (*Digitalis purpurea*, Linn.), remarkable for its accumulative power in the system, and its action upon the heart; and the European Hedge Hyssop (*Gratiola officinalis*, Linn.), whose active principle so nearly resembles that of Veratrum.

The following species are more or less noted in medical literature as secondary plants: the tropical Indian anti-rheumatic *Herpestes Monniera*, H.B.K.; the Peruvian tonic and febrifuge *Tumpu* (*Calceolaria trifida*, Vahl.), and emetic and purgative *C. pinnata*, Linn.; the Guayanian Bitter Blain (*Vandellia diffusa*, Linn.), highly valued by the natives as an emetic and purgative in malignant fever and dysentery; and the Malabar specific for gonorrhœa, *Torenia Asiatica*, Linn. Several other species of *Digitalis* are said to possess the full action of *D. purpurea*, among which the following are prominent: The Swiss *Digitalis ambigua*, Murr.; the Levantine *D. orientalis*, Lam.; the German *D. purpurascens*, Roth.; and the Italian *D. ferruginea*, Linn. The European Water-Betony (*Scrophularia aquatica*, Linn.) is noted in France as the *herbe du siége*, from its having been the sole support at one time of the garrison of Rochelle during the celebrated siege by Cardinal Richelieu in 1628.

History and Habitat.—The common Mullein is a native of the Isle of Thapsos, now found in most parts of Europe. In North America it has become thoroughly naturalized, principally though, in the Eastern United States, where it frequents waste grounds and dry fields. It flowers throughout the summer months, its fruit being fully ripe in October.

Verbascum has been known as a medical plant from ancient times. The Φλόμος of Hippocrates and other ancient writers is supposed to be this species, though Sibthorp states that it is the male Λευκη φλόμος; Sprengel judges that the emale is the mullein and the male the *V. undulatum*.[*]

The principal use of this herb in medicine has been as an anodyne-pectoral, and remedy for catarrhal coughs and diarrhœas. Dr. Home[†] concludes upon trial that it "is useful in diminishing or stopping diarrhœa of an old standing, and often in easing the pains of the intestines." Rafinesque[‡] sums up its uses as follows: "Leaves soft, like velvet; equal to flannel in rheumatism for frictions; formerly thought to cure agues; emollient in poultice; good discutient to reduce swelled and contracted sinews. Tea sub-astringent, bitterish, used for diarrhœa; strong decoction in wash for piles, scalds, and wounds of cattle. Blossoms better than leaves, anodyne, antispasmodic, repellant, pectoral, make a perfumed tea useful for coughs, hemoptysis, hemorrhage and proctalgy." The flowers placed in a bottle and set in the sunshine are said to yield a fatty matter valuable as a cure for hemorrhoids. The plant is just now being introduced as a valuable remedy in pulmonary phthisis, articles appearing from time to time in various medical and scientific periodicals upon this point. Dr. F. J. B. Quinlan regards the plant as having a distinct weight-increasing power in early cases of pulmonary consumption. The hot decoction, he claims, causes a comfortable sensation, which, patients who have taken it, experience a decided physiological need of. "It eases phthisical cough, some patients scarcely requiring cough medicines at all" who use this remedy. "Its power of checking phthisical looseness is very marked, and it also gives great relief to the dyspnœa. It is, however, useless in advanced cases, and has no effect in checking night sweats."* The leaves are considered to be diuretic, demulcent, anti-spasmodic, and anodyne; and the seeds are said to pass readily and rapidly through the intestinal canal, thus proving useful for the removal of obstructions.

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[*] Hamilton, *Flora Hom.*, II., 218.

[†] Woodville, *Med. Bot.*, II., 203.

[‡] *Med. Flora*, II., 273.

Verbascum plays no part in the U. S. Ph.; in the Eclectic Materia Medica its preparation is *Cataplasma Verbasci.*

PART USED AND PREPARATION.—The fresh plant, gathered in July, when coming into blossom, should be chopped and pounded to a pulp and weighed. Then two parts by weight of alcohol are taken, the pulp thoroughly mixed with one-sixth part of it, and the rest of the alcohol added. After having stirred the whole well, pour it into a closely-stoppered bottle, and allow it to stand eight days in a dark, cool place. The tincture separated by filtration should be opaque, in thin layers it has a deep reddish-brown color by transmitted light. It should have a sweetish, herbaceous odor, a smoothish astringent taste, and decided acid reaction.

CHEMICAL CONSTITUENTS.—An analysis of the flowers by Morin yielded a yellow volatile oil, a fatty acid, free malic and phosphoric acids and their -ate salts of lime, a yellow resinous coloring matter, and the general plant constituents, including an uncrystallizable sugar. The leaves contain mucilage.

PHYSIOLOGICAL ACTION.—Many of the symptoms caused by from 30 to 40 ounces of a tincture of the fresh leaves daily, are characteristic of the action of this drug. In Hahnemann's experiments the following prominent effects are noted; Vertigo on pressing the left cheek with the hand; dull pressure at the left infra-maxillary condyle, with painful tearing and drawing in the ear; sensation as if the temporal eminences were crushed with pincers;† numbness in the left ear, with a sensation as if the ear would be drawn inward; severe drawing, pressure, and numbness of the left malar bone, temple and zygoma; root of tongue coated brown; urging to urinate, with decreased secretion; constrictive and pressive pains in the bones and muscles, and weakness of the lower limbs. The action of

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* *Am. Jour. Phar.*, 1883, 268; from *Brit. Med. Jour.*

† I judge from my own experiments with plants, that the pains similar to crushing of bones with excruciating tearing sensation, is due to the Malic acid contained in them. I have never noted the symptom as arising from experiments with drugs not containing this body. The minor symptoms of disinclination to work, sleepiness after dinner, general shiftlessness, etc., of Verbascum arose also in my experimentation with the *Sheep sorrel* (*Oxalis stricta*, Linn.), which contains Malic among other vegetable acids.

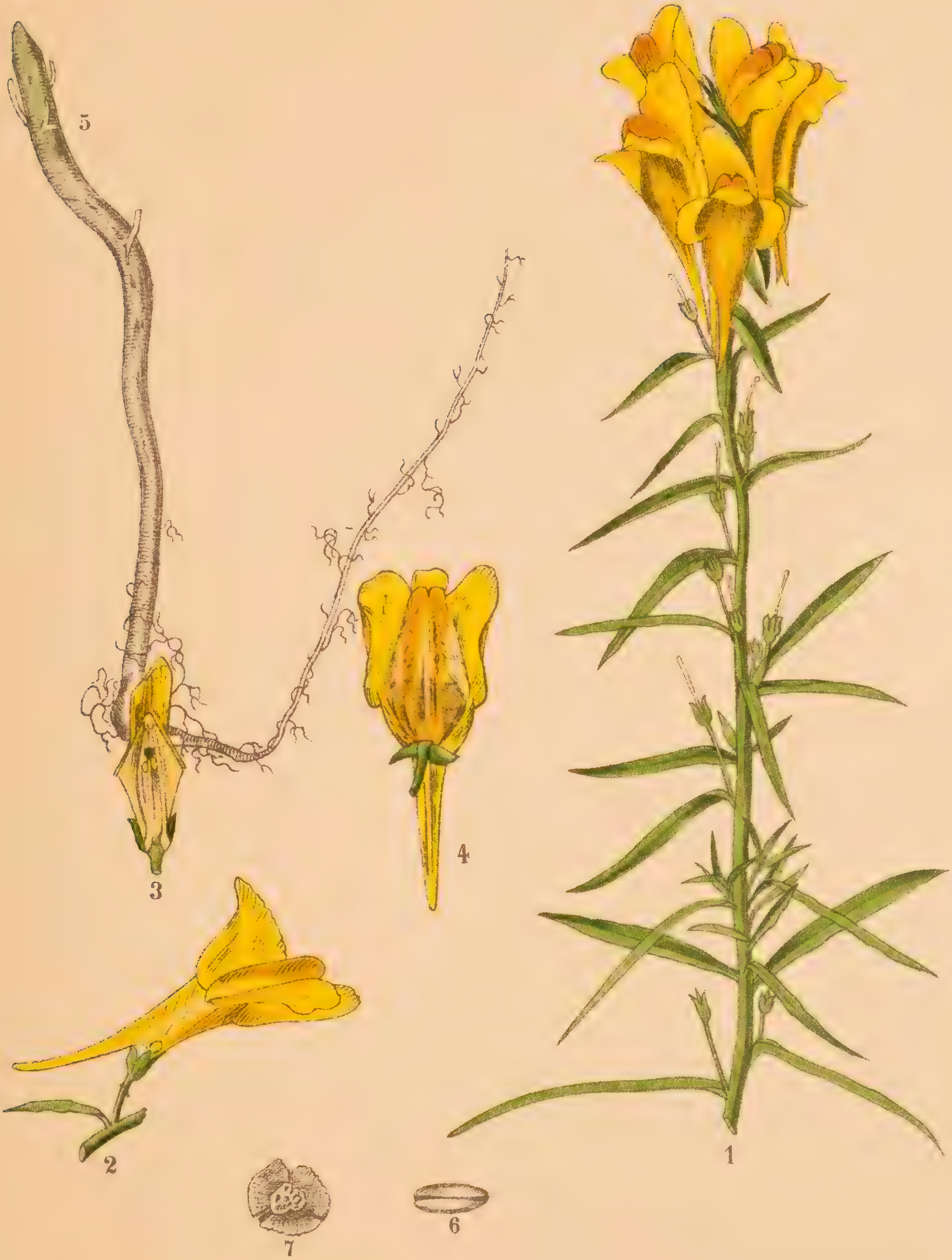
Verbascum seems to be a somewhat peculiar irritation of the temporo-facial branch of the seventh pair of cranial nerves and a somewhat narcotic action upon the brain.

Hahnemann observes that the narcotic effects of the drug wore off in about two hours in his experiments. The seeds of Verbascum Lychnitis and Thapsus have often been employed to stupefy fish.

DESCRIPTION OF PLATE 110.

1. Upper portion of a young plant, Pamrapo, N. J., June 29th, 1879.
2. Flower.
3. Pistil.
4. Anther of beardless stamen.
5. Bearded stamen.
6. Pollen, x 250.
7. A portion of the root.

(3-5 enlarged.)



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LINÀRIA VULGÀRIS, Mill.

Tribe.—ANTIRRHINEÆ.

GENUS.—**LINARIA**,* TOURN.

SEX. SYST.—DIDYNAMIA ANGIOSPERMIA.

LINARIA.

TOAD FLAX.

SYN.—LINARIA VULGARIS, MILL.; ANTIRRHINUM LINARIA, LINN.

COM. NAMES.—TOAD FLAX, FALSE FLAX, YELLOW FLAX, RANSTED, JACOB'S LADDER, CONTINENTAL WEED, BUTTER AND EGGS; (GER.) FRAUENFLACHS, LEINKRÄUT, LOWENMAUL; (FR.) LINAIRE COMMUNE.

A TINCTURE OF THE FRESH PLANT LINARIA VULGARIS, MILL.

Description.—This too-common roadside weed grows to a height of from 1 to 3 feet, from a perennial root. *Root* woody, creeping, white and fibrous. *Stem* erect and simple. *Leaves* pale green, glaucous, arranged alternately, or more or less scattered or whorled upon the stem; sesile, linear-lanceolate, with an acute tip, and vary from 1 to 3 inches in length. *Inflorescence*, a terminal, densely-flowered, spiked raceme; flowers 1 inch long, bright yellow, with a chrome-colored palate. *Calyx* five-parted, shorter than the spur of the corolla. *Corolla* tubular, masked with a projecting, bifid palate, that nearly closes the ringent throat. *Upper lip* two-cleft. *Lower lip* trifid, the middle lobe smallest. *Spur* awl-shaped, situated upon the lower side of the base. *Stamens* four, didynamous. *Anthers* two-celled. *Pollen* grains oval, with a deep sulcus and induplicate edges. *Fruit* a thin, two-celled ovoid capsule, opening by two slits below the apex. *Seeds* numerous, flattened, with a nearly complete winged margin. For description of the natural order Scrophulariaceæ, see Verbascum Thapsus, 110.

History and Habitat.—This pernicious, widely-spreading weed, doubtless has its origin in Europe. It is now but too thoroughly naturalized here; its injuriousness, however, being somewhat mitigated by its choice of ground, growing as it does only in waste places, dry sandy fields, and along the embankment of railroads and roadways. It blossoms through the summer months, fruiting as it flowers. Linnæus states (*Flor. Suec.*) that a decoction of this plant in milk was used as a fly poison. Its previous medical uses were internally for jaundice and anasarca, and externally for hemorrhoids, but it has dropped out of use entirely, except with us.

PART USED AND PREPARATION.—The whole fresh plant, gathered when in full flower, is chopped and pounded to a pulp and weighed. Then two parts by weight of alcohol are taken, the pulp mixed thoroughly with one-sixth part of it and the rest of the alcohol added. The whole is then poured into a well-stoppered bottle and allowed to stand for eight days in a dark, cool place. The tincture is then separated by straining and filtering. Thus prepared, it has a very deep brownish-red color by transmitted light, a taste at first cooling and sour, then like weak tea, and a very acid reaction.

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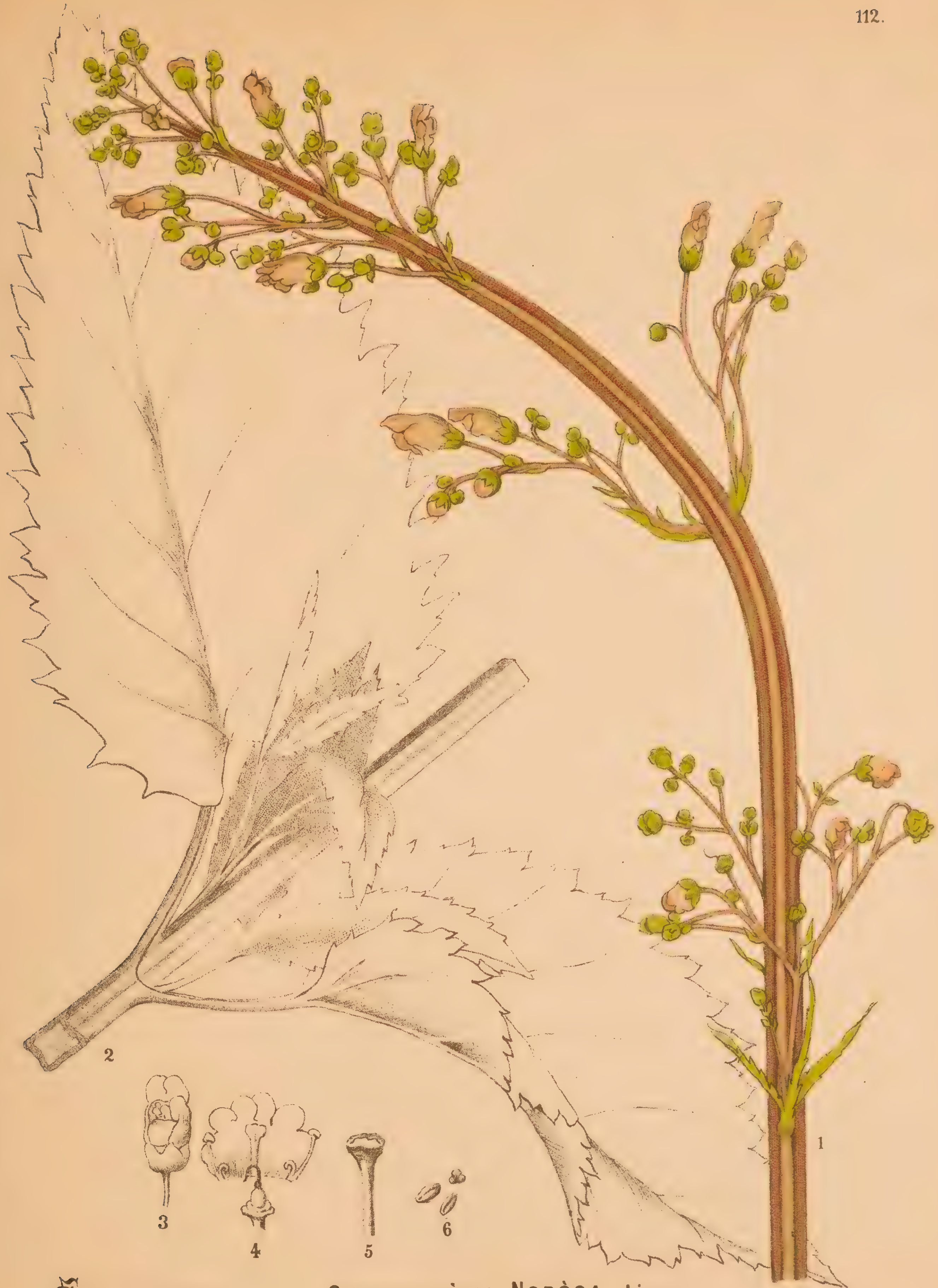
* The leaves of some species resembling those of flax (*Linum*).

CHEMICAL CONSTITUENTS.—I am unable to find any chemical data regarding this plant, with the exception of the flowers; they have been analyzed, but show nothing of the active principle, which probably lies in its acid.

PHYSIOLOGICAL ACTION.—The true action, physiologically, of this plant is not known. The provings have been carefully made, and show symptoms of some importance, but are not sufficient to determine its sphere.

DESCRIPTION OF PLATE 111.

1. Upper part of a plant from W. Brighton, S. I., July 5th, 1879.
2–4. Flowers.
3. Section of flower.
5. Root.
6. Pollen x 380.
7. Seed (enlarged).



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SCROPHULÀRIA NODÒSA, Linn.

GENUS.—**SCROPHULARIA**,* TOURN.

SEX. SYST.—DIDYNAMIA ANGIOSPERMIA.

SCROPHULARIA.

FIG-WORT.

SYN.—SCROPHULARIA NODOSA, LINN.; SCROPHULARIA MARILANDICA, LINN.; SCROPHULARIA NODOSA, VAR. AMERICANA, MICHX.; SCROPHULARIA LANCEOLATA, PURSH.

COM. NAMES.—FIG-WORT, SCROFULA-PLANT, HEAL-ALL, HOLMES-WEED, SQUARE-STALK, CARPENTER'S SQUARE; (FR.) SCROPHULAIRE; (GER.) KROPFWURZ, SCROPHELNPFLANZE.

A TINCTURE OF THE WHOLE FRESH PLANT SCROPHULARIA NODOSA, LINN., OR VAR. MARILANDICA, GRAY, OR BOTH.

Description.—This rank perennial herb grows to a height of from 2 to 4 feet. *Stem* clearly quadrilateral, with slight obtuse ridges at the angles, glabrous throughout. *Leaves* opposite, ranging from oval below to lanceolate above, doubly serrate, and cordate or nearly so at the base. *Inflorescence* a primarily nodding terminal panicle, of loose, 3 to 6-flowered cymes; *flowers* small, lurid, brownish- or greenish-purple. *Calyx* deeply 5-cleft into ovate, equal lobes. *Corolla* globose, contracted at the throat, and furnished with a two-lipped border; *petals* 5, the *upper lip* of two erect, equal lobes, the *lower lip* composed of a lateral equal pair, shorter however than those of the upper, and a lower reflexed, spreading lobe, closely appressed to the tube. *Stamens* 4, curled inward with the anthers closely surrounding the ovary; they become erect when ripening, and finally decline. The rudiment of a fifth stamen forms a protuberance at the summit and in the throat of the corolla-tube. *Filaments* pubescent, broader above than below; *anthers* with two confluent cells, opening transversely at the apex. *Fruit* a 2-celled, ovoid, septicidal, many-seeded pod; *seeds* black, rough, and dotted with minute pits. Read description of the N. Order under Verbascum, 110.

History and Habitat.—The Fig-wort grows along the borders of woods and dry roadsides, from Utah eastward throughout the United States and Canada, flowering from June to September. The European *Scrophularia nodosa* and our *var. Marilandica* seem to differ but slightly in their parts and properties from the species under consideration. This herb is said to serve as a soothing poultice to inflamed tumors, suppurating mammæ, ulcers, burns, hemorrhoids, etc.; it is also used alone and as a component of salves, for itch, various eruptions, and "scabs" in swine, as well as a tonic and deobstruent in hepatic and glandular disorders. All parts of the plant have a heavy, rank odor when bruised, resembling that of the elder (*Sambucus*).

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* On account of its repute in scrofula.

Scrophularia is not mentioned in the U. S. Ph.; in the Eclectic Materia Medica it is officinal as *Decoctum Scrophulariæ*, and as a component of *Syrupus Rumecis Compositus*, and *Tinctura Corydalis Composita*.

PART USED AND PREPARATION.—The whole fresh plant, gathered just before flowering, should be chopped and pounded to a pulp and weighed. Then two parts by weight of alcohol should be taken, the pulp thoroughly mixed with one-sixth part of it, and the rest of the alcohol added. After having stirred the whole, pour it into a well-stoppered bottle and let it stand eight days in a dark, cool place. The tincture, separated by straining and filtering, should have a beautiful deep crimson color by transmitted sunlight, a rank, acrid odor and taste, and strong acid reaction.

CHEMICAL CONSTITUENTS.—SCROPHULARIN; this principle, the chemistry of which has not yet been determined, was extracted from a decoction of the fresh plant by Walz.* It crystallizes in bitter scales, soluble in both alcohol and water.

Scrophularosmin; this stearoptene was also discovered by Walz in an aqueous distillate of the plant.

Walz's analysis also yielded *acetic acid*, $C_2H_4O_2$; *propionic acid*, $C_3H_6O_2$; *pectin*, $C_{32}H_{48}O_{32}$; and a red *coloring matter*.

PHYSIOLOGICAL ACTION.—According to Dr. Blakely,† this drug, in repeated doses of from 20 drops to a teaspoonful of the tincture, causes: Fullness of the head, and vertigo; free bleeding of the gums; salivation; increased appetite; colic; general weariness; sleepiness; and sallow skin.

In this experimenter the drug seemed to expend its force upon the liver.

DESCRIPTION OF PLATE 112.

1. Panicle.
2. Second pair of leaves from panicle.
3. Flower, under side.
4. Corolla opened to show sexual organs.
5. Ripe stamen (enlarged).
6. Pollen, x 250.

Binghamton, N. Y., June 8th, 1884.

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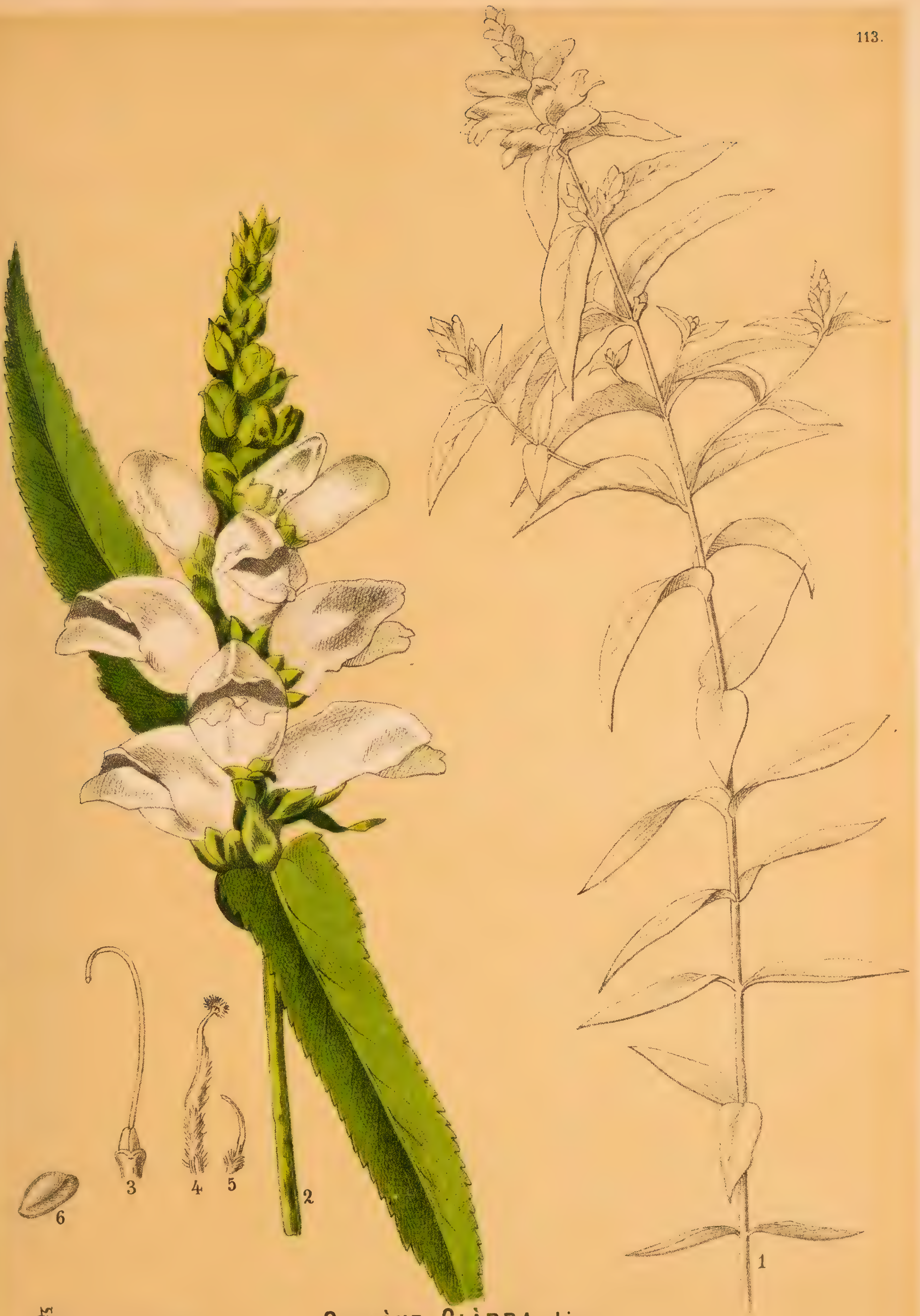
* Mayer in Am. Jour. Phar., 1863, p. 295.

† N. A. Jour. Hom., 1866, p. 187.



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CHELÒNE GLÀBRA, Linn.

Tribe.—CHELONEÆ.

GENUS.—**CHELONE**,* LINN.

SEX. SYST.—DIDYNAMIA ANGIOSPERMIA.

CHELONE GLABRA.

TURTLE-HEAD.

SYN.—CHELONE GLABRA, LINN.; CHELONE OBLIQUA, LINN.

COM. NAMES.—TURTLE-HEAD, SNAKE-HEAD, SHELL-FLOWER, BALMONY, SALT-RHEUM WEED; (FR.) CHELONE; (GER.) GLATTE, CHELONE.

A TINCTURE OF THE FRESH PLANT CHELONE GLABRA, LINN.

Description.—This beautiful swamp herb grows to a height of from 2 to 6 feet, from a creeping perennial root. The *stem* is smooth, upright, somewhat obtusely four angled, and branching laterally, particularly near the top. It is a question though, whether it is really a branching herb, or whether the so-called branches are merely elongated peduncles of the lateral axillary flower spikes. The *leaves* are opposite, either sessile or very short petiolate, broadly lanceolate, serrate and pointed, ranging from 2 to 4 inches in length and of various breadths. The *inflorescence* consists of a dense, bracted spike, terminal upon the stem and its branches?; the flowers are sessile, closely imbricated with concave, rounded-ovate, sharp-pointed bracts and bractlets. *Calyx* of five deeply parted or distinct imbricated sepals. *Corolla* tubular, with either equal or unequal lateral inflations, the mouth either a little open or widely gaping; *upper lip* broad-arching, keeled in the middle, and either entire or notched at the apex; *lower lip* 3-lobed at the apex, the middle lobe narrow or sometimes smallest. *Stamens* consisting of four didynamous, included, fertile or complete ones and one sterile or rudimentary; *filaments* flat, woolly, the rudimentary fifth much smaller than the other four; *anthers* heart-shaped, acuminate, completely connected in pairs by the adhesive cottony wool; *pollen* more or less cylindrically "hat-shaped," the sulcus being between the crown and the rim. *Pistil* as a whole, projecting beyond the stamens; *ovary* 2-celled, ovoid; *style* long, slender and cylindrical; *stigma* small and blunt. *Fruit* a 2-grooved, 2-celled ovoid capsule, opening by dehiscence through the partition, each half carrying a section with it bearing the placentæ. *Seeds* numerous, winged and margined. A description of the natural order may be found under Verbuscum thapsus, 110.

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* χελώνη, tortoise, from the resemblance of the corolla to the head of that reptile.

History and Habitat.—This strikingly erect plant, native of Canada and the United States, grows—though not in great abundance in any one locality—about the margins of swampy places and along the wet edges of open woods, flowering from August to September. The flowers are large and without odor, they vary from white to cream, rose or purplish; varieties have been at different times named both on account of the color of the flowers and the mode of growth, but they are too indistinctly separate to afford a place and name. *C. alba; C. rosea; C. purpurea; C. lanceolata;* and *C. obliqua.*

Balmony has for years been a favorite tonic, laxative and purgative, among the aborigines of North America and Thomsonian physicians; without sufficient reason however as a tonic, in the doses usually employed.

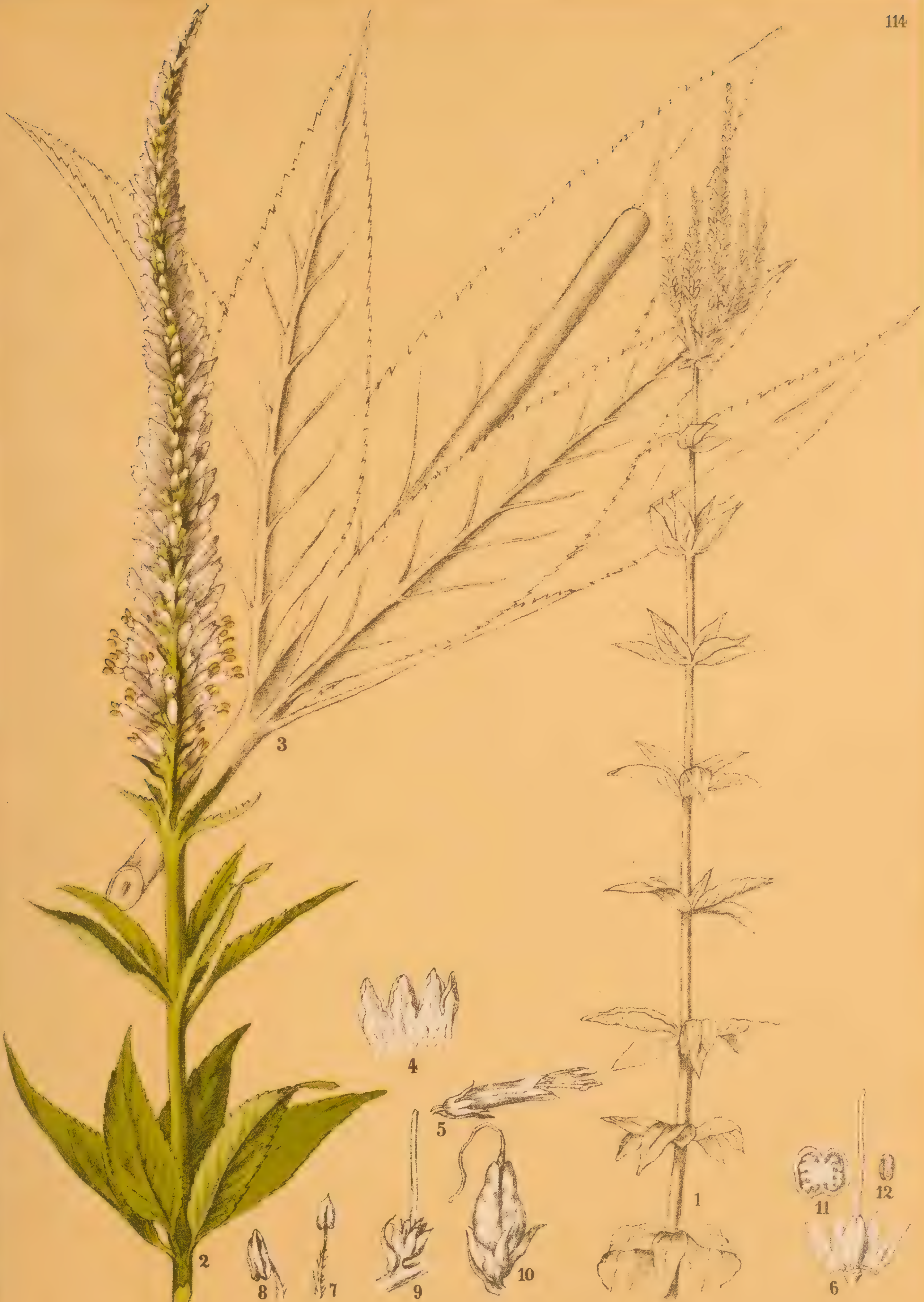
Chelone has no place in the U. S. Ph. In the Eclectic Materia Medica it is officinal as *Decoctum Chelonis.*

PART USED, AND PREPARATION.—The fresh herb as a whole, is chopped and pounded to a pulp and weighed. Then two parts by weight of alcohol are taken, the pulp mixed with one-sixth part of it, and the rest of the alcohol added. After thorough stirring, and pouring the whole into a well-stoppered bottle, it is allowed to stand eight days in a dark, cool place. The tincture is then separated by straining and filtering. Thus prepared, it has a clear orange-brown color by transmitted light, a bitter taste and highly acid reaction.

CHEMICAL CONSTITUENTS.—No analysis has been made of this plant; all parts of it are very bitter, and as it yields this property to alcohol and water, we may consider at least, that the active body is soluble in these liquids.

Description of Plate 113.

1. Whole plant five times reduced, from Binghamton, N. Y., August 15th, 1882.
2. Apex of stem in flower.
3. Pistil (enlarged).
4. Fertile stamen (enlarged).
5. Rudimentary stamen (enlarged).
6. Pollen x 380.



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VERÓNICA VIRGÍNICA, Linn

Tribe.—SIBTHORPIEÆ, VERONICEÆ, etc.

GENUS.—**VERONICA**,* LINN.

SEX. SYST.—DIANDRIA MONOGYNIA.

LEPTANDRA.

CULVER'S PHYSIC.

SYN.—VERONICA VIRGINICA, LINN.; V. PURPUREA, STEUD.; V. SIBIRICA, LINN.; V. JAPONICA, STEUD.; LEPTANDRA VIRGINICA, NUTT.; PÆDEROTA VIRGINICA, TORR.; CALLISTACHYA VIRGINICA, AND EUSTACHYA ALBA, RAF.

COM. NAMES.—CULVER'S ROOT OR PHYSIC, BLACK ROOT, TALL SPEEDWELL, HIGH VERONICA. WHORLY WORT, QUINTEL, HINI; (FR.) VERONIQUE DE VIRGINIE; (GER.) VIRGINISCHER EHRENPREIS.

A TINCTURE OF THE FRESH ROOT OF VERONICA VIRGINICA, LINN.

Description.—This graceful perennial herb grows to a height of from 1 to 7 feet. *Root* horizontal, blackish, sometimes branched, scarred upon its upper surface by the previous growths, and giving off from the nether numerous long and fibrous rootlets. *Stem* simple, strict, and glabrous. *Leaves* whorled in numerous clusters of from 3 to 9; short petioled, lanceolate, acute, tapering at both ends, finely serrate, and often downy beneath especially upon the veins. *Inflorescence* in from 1 to 9 terminal, panicled, spike-like, densely-flowered racemes; *flowers* small, nearly sessile; *bracts* very small, subulate. *Calyx* 4-parted, persistent; *sepals* lanceolate, acute. *Corolla* salver-form, pubescent within, the tube much longer than the 4-parted limb, and greatly exceeding the calyx; *lobes* erect, acute, the upper broadest, the lower narrowest. *Stamens* 2, far exserted; *filaments* hairy, inserted low down upon each side of the upper lobe of the corolla and about twice its length; *anthers* rather large, 2-celled; *cells* confluent at the apex. *Ovary* superior, 2-celled; *style* columnar, entire, exserted, persistent; *stigma* solitary, capitate. *Fruit* an oblong-ovate, 2-celled pod, not notched at the apex nor much flattened; *dehiscence* by 4 apical teeth, at length becoming somewhat loculicidal; *seeds* numerous, black, oval, and terete; *testa* minutely reticulated.

History and Habitat.—This most graceful and attractive of all American Veronicas, habits moist wooded banks from Canada and the valley of Winnipeg, to Georgia, Alabama, and Missouri. It blossoms contemporaneously with Cimicifuga early in July, and, when viewed at a distance, the two plants appear to be the same, while either has a beauty and grace which would render it poetically suitable for a fairy's wand. The species also grows in Japan and Eastern India, and varies somewhat in color of anther and perianth in different localities. Culver's Physic was introduced into English gardens in 1714, and has been somewhat planted in this country.

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* Dedicated to St. Veronica; or, perhaps, a play upon Betonica.

This is one of the many American Aboriginal remedies handed down by them to the botanics, and extensively, therefore, used in domestic practice from our earliest settlements. In a fresh state the root gained a great reputation as a drastic purge and abortivant, but its action was too uncertain and severe; in this state it was also frequently employed in intermittents, and was thought to be a prophylactic against future attacks. The use of the fresh drug has, however, almost ceased in general practice, giving place to the dried root, and an extractive called *Leptandrin.* Doses of from 20 to 60 grains of the powdered root have been used as a stomachic tonic, laxative, and antiperiodic; in dyspepsia, torpidity of the liver, debilitated conditions of the alimentary tract, typhoid and intermittent fever, and some forms of dysentery and diarrhœa. Speaking of the drug in the light of sixty years ago, Rafinesque says:* "The root alone is medical; it is bitter and nauseous, and is commonly used in warm decoction as purgative and emetic, acting somewhat like the *Eupatorium* and *Verbena hastata;* some boil it in milk for a milder cathartic, or as a sudorific in pleurisy. A strong decoction of the fresh root is a violent and disagreeable, but effectual and popular remedy in the Western States, for the summer bilious fevers."

The officinal preparations of the U. S. Phar. are: *Extractum Leptandræ* and *Extractum Leptandræ Fluidum.* In the Eclectic Materia Medica the same preparations are recommended, and the following also advised: *Extractum Leptandræ Hydroalcoholicum* and *Tinctura Leptandræ.*

PART USED AND PREPARATION.—The fresh root of the second year, gathered after fruition, should be chopped and pounded to a pulp and weighed. Then two parts by weight of alcohol are to be taken, the pulp thoroughly mixed with one-sixth part of it, and the rest of the alcohol added. After stirring the whole well, transfer it to a well-stoppered bottle, and allow it to macerate eight days in a dark, cool place, shaking twice a day.

The tincture, prepared from this mass by pressing and filtering, has a deep reddish-orange color by transmitted light; a somewhat earthy odor; no characteristic taste; and an acid reaction.

CHEMICAL CONSTITUENTS.—*Leptandrine.*† This bitter principle, separated by Wayne,‡ retains the characteristic odor of the root. It is crystallizable when free from coloring-matter, and is soluble in water, alcohol, and ether.

Tannin, gum, resin, volatile oil, and mannite,§ a volatile alkaloid, citric acid, and a saponin-like body having a glucosidal nature,‖ have also been determined.

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* *Med. Flora,* 2, 22.

† This name is proposed, that the substance may not be confounded with "*Leptandrin,*" the extract of the tincture now on the market.

‡ *Proc. Am. Phar. Assoc.,* 1856, 34.

§ Wayne, *Am. Jour. Phar.,* 1859, 557.

‖ Mayer, *Am. Jour. Phar.,* 1863, 298.

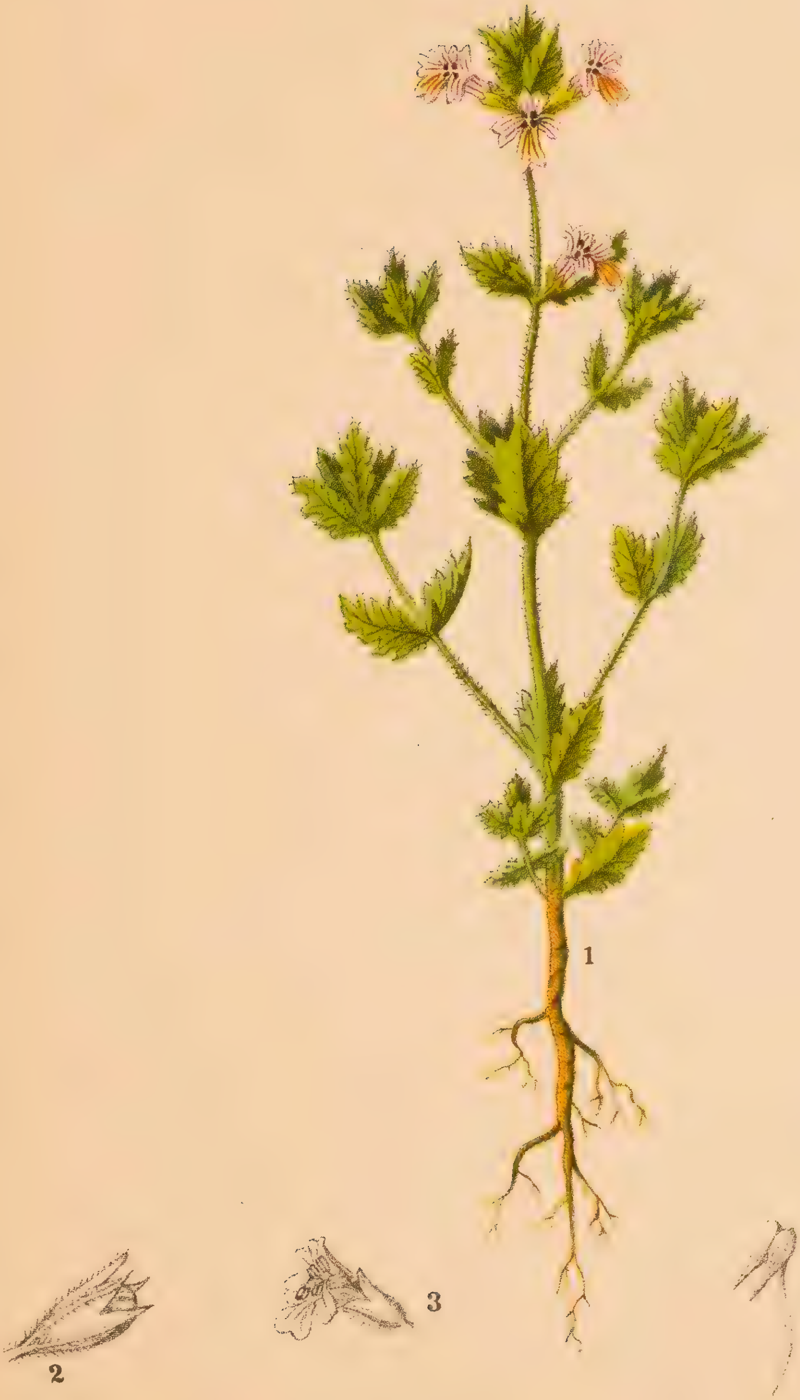
PHYSIOLOGICAL ACTION.—Full doses of the recent root of Leptandra cause dimness of vision, vertigo, vomiting, and purging of bloody or black, tarry, papescent feces. Dr. Burt's experiments with from 1 to 40 grains "Leptandrin" and 20 to 160 drops of the fluid extract gave the following symptoms: Headache, smarting of the eyes and lachrymation; yellow-coated tongue; nausea, burning and distress in the stomach; severe abdominal pains with great desire for stool; profuse black, fetid discharges from the bowels; general lassitude; hot, dry skin; and sleepiness,

Leptandra proves itself to be a severe irritant to the gastric and intestinal mucous surfaces, and a stimulant to the absorbent system.

DESCRIPTION OF PLATE 114.

1. Whole plant, 6 times reduced, Binghamton, N. Y., July 27th, 1885.
2. Summit of single-racemed plant.
3. Third whorl of leaves from top of No. 1.
4. Limb of corolla.
5. Flower.
6. Calyx and pistil.
7. Stamen.
8. Anther.
9. Bract and calyx.
10. Fruit.
11. Horizontal section of ovary.
12. Seed.

(4–12 enlarged.)



F.M. ad nat del. et pinxt.

EUPHRÀSIA OFFICINÀLIS, Linn.

N. ORD.—SCROPHULARIACEÆ.

Tribe.—EUPHRASIEÆ.

GENUS.—**EUPHRASIA**,* TOURN.

SEX. SYST.—DIDYNAMIA ANGIOSPERMIA.

EUPHRASIA.

EYEBRIGHT.

SYN.—EUPHRASIA OFFICINALIS, LINN.; E. CANDIDA, SCHŒN.; EUPHRAGIA ALBA, BRUN.

COM. NAMES.—EYEBRIGHT, EUPHRASY; (FR.) EUPHRAISE; (GER.) AUGENTROST.

A TINCTURE OF THE HERB EUPHRASIA OFFICINALIS, LINN.

Description.—This low annual only grows to a height of a few inches. *Stem* erect, hairy; *branches* opposite. *Leaves* opposite, varying from roundish-ovate to oblong; *margin* incisely dentate, that of the upper or floral leaves with strongly setaceous teeth; in the lower leaves tending more to crenate. *Inflorescence* spicate; *bracteoles* none; *flowers* small, whitish. *Calyx* tubular-campanulate, 4-cleft; *lobes* acute, pointed. *Corolla* purple-striped, dilated at the throat, bilabiate, the lips subequal; *upper lip* erect, barely concave, 2-lobed, the sides revolute; *lobes* emarginate; *lower lip* external in the bud, spreading, 3-lobed; *lobes* emarginate, the middle one largest and yellow. *Stamens* 4, didynamous, rising under the upper lip of the corolla; *anthers* 2-celled; *cells* equal, distinct, each mucronate at its base. *Style* filiform; *stigma* entire. *Fruit* an oblong, flattened, loculicidal capsule; *seeds* numerous, pendulous, oblong, and longitudinally sulcate.

History and Habitat.—Euphrasia is indigenous to Europe and North America- With us its growth is depauperate and its stations few. It ranges, here, from the north-eastern coast of Maine over the alpine summits of the White Mountains and Adirondacks; thence northward and westward along the upper shore of Lake Superior to the Aleutian Islands. In many of these locations a dwarf form, with very small flowers, is found. It flowers in July and August.

Though this herb has always been known under a name of Greek originl still no mention of the plant is made by Dioscorides, Pliny, Galen, or even by the Arabian physicians. F. Bauhin says that it was known as a remedy for the eyes about the year 1380.† Arnoldus Villanovanus, who died in 1313, was the author of "*Vini Euphrasiati tantopere celebrati.*" How long before him Euphrasia was in repute for eye diseases, is impossible to say; but in Gordon's "*Liticium Medicinæ,*" published in 1305, among the medicines for the eyes Euphragia is one, and is recommended both outwardly in a compound, distilled water, and inwardly as a syrup.* Euphragia is not mentioned in the *Schola Salernitana*, compiled about 1100. The earliest notice of Euphrasia, as a medicine, is in the works of Tragus.† It was employed as a remedy in diseases of the eyes, by Fuschius, Dodonæus, Haller, and others, and has been a vulgar remedy in these diseases from time immemorial, throughout the whole of Europe. Fuschius recommended it in suffusions and cataracts. The Highlanders, of Scotland, make an infusion of it in milk, and anoint the patient's eyes with a feather dipped in it. Hoffman employed it in jaundice; Villanova and Velebt, in weakness of the eyes. In 1836, Kramehfeld‡ employed it, with success, in rheumatic and catarrhal inflammation of the eyes and their lids; in cough, hoarseness, earache, and headache, which have succeeded catarrhal affections; and glandulous, catarrhal, and scrofulous blepharophthalmia.§

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* Εὐφρασία, *euphrasia,* cheerfulness; as to its effect upon the spirits through its benefit to the sight.

† *Phytop.*, 442

Woodville says:‖ "Euphrasia derives its name from its reputed efficacy in various disorders of the eyes, for which it was used both externally and internally, and has long been so much celebrated as to be considered almost in the character of a specific, the '*verum oculorum solamen.*' But as there cannot possibly be a general remedy for all diseases of the eyes, the absurd and indiscriminate recommendation of Euphrasia as such, must receive but little credit from those who practice medicine on rational principles. It must be acknowledged, however, that some authors have stated peculiar complaints of the eyes, in which the use of this plant was thought more remarkably evident; and, judging by these, we should say that eyes, weakened by long-continued exertion, and those that are dim and watery, as in a senile state, are the cases in which Euphrasia promises most advantage; nor are old people to despair, for according to Hildanus and Lanzonus, several, at the age of seventy and eighty years, were recovered from almost entire blindness." He further remarks that the Icelanders are in the constant habit of using the juice of the plant in all affections of the eyes; and adds that, "though the great reputation which Eyebright formerly supported for several ages, must have induced some practitioners to have used it; yet we do not find a single instance of its efficacy recorded in modern times. How far this remark ought to invalidate the positive testimonies in its favor, we leave others to determine."

Dr. John King remarks¶ that four fluid ounces of the infusion morning and night, upon an empty stomach, has cured epilepsy.

PART USED AND PREPARATION.—The whole fresh flowering plant, above the root, gathered from barren, sunny spots, should be treated as directed for Verbascum, Scrophularia, and Chelone (ante, pp. 110–2, 112–2, 113–2). The resulting tincture has a deep brownish-red color by transmitted light; a pleasant, vinous odor; a bitter, astringent taste; and an acid reaction.

CHEMICAL CONSTITUENTS.—*Euphrasia-Tannic Acid*, $C_{32}H_{40}O_{17}$.—This peculiar tannin gives a dark-green precipitate with ferric salts, and is only obtainable by combination with lead. It is precipitable by glue, and tartrate of antimony (Wittstein).

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* Allston, *Mat. Med.*, 7, 139.

† Sprengel, *op. cit.*

‡ *Ozann's Journal.*

§ Hamilton, *Flor. Hom.*, 1, 275.

‖ *Med. Bot.*, 2, 369.

¶ *Am. Disp.*, *loc. cit.*

The volatile oil, and acrid and bitter principle, have not as yet been chemically analyzed.

PHYSIOLOGICAL ACTION.—The symptoms caused by doses varying from 10 to 60 drops of the tincture, observed by several German experimenters,* were substantially as follows: Confusion of the mind and cephalalgia; violent pressure in the eyes with lachrymation and itching, redness and swelling of the margins of the lids, violent burning of the lids, dimness of vision, sensation as though the eye were covered with mucus; weakness, and photophobia; sneezing and fluent coryza; odontalgia; nausea; constipation; hoarseness, violent cough, with profuse expectoration, and difficult breathing; yawning and sleeplessness; profuse secretion of urine; and sweat.

DESCRIPTION OF PLATE 115.

1. Whole plant, once enlarged, Kearsarge, N. H., July 24th, 1883.
2. Calyx.
3. Flower.
4. Stamen.
5. Seed.

(2–5 enlarged.)

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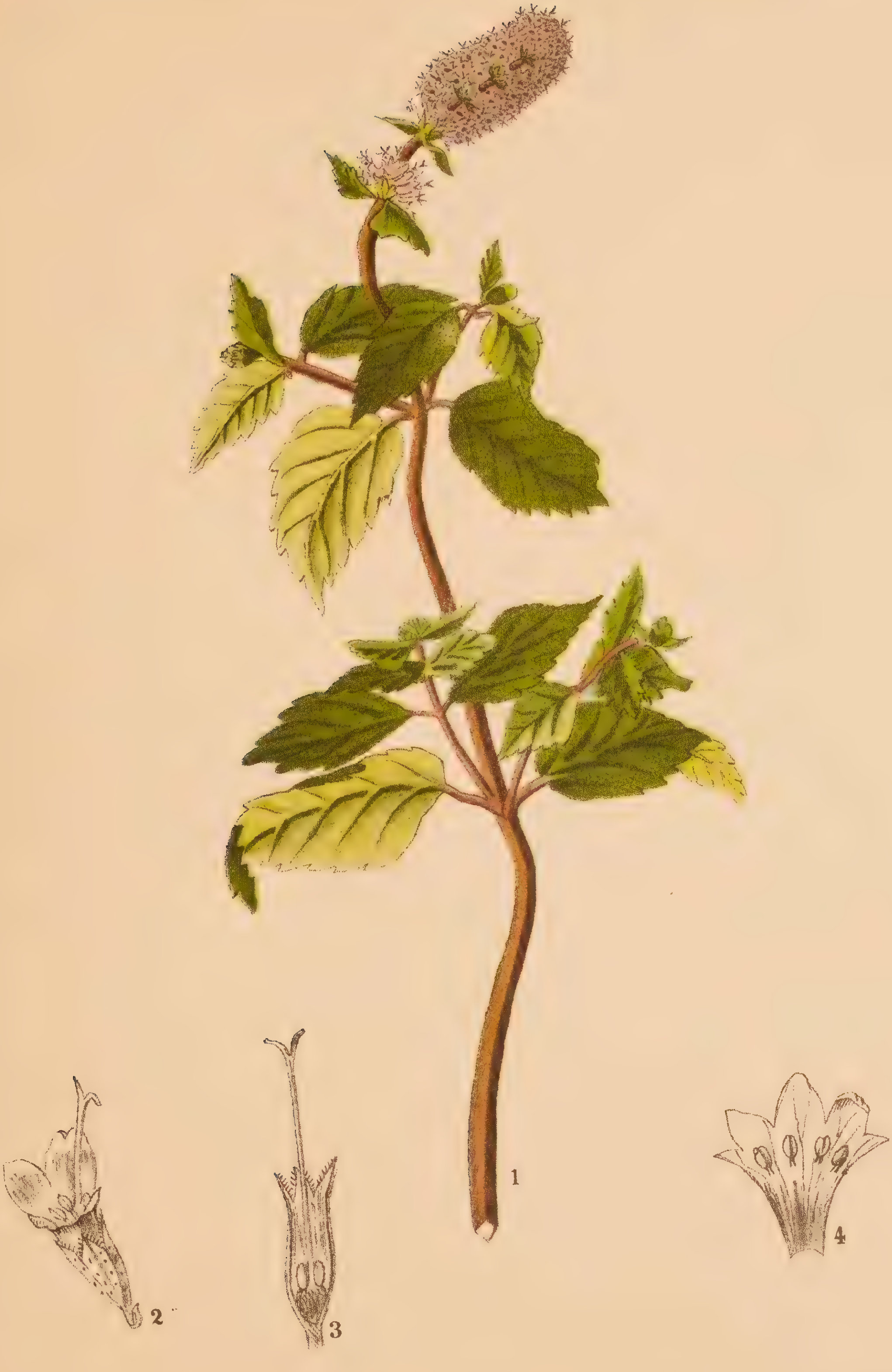
* See *Allen's Encyc.*, 4, 254.



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MÉNTHA PIPERÌTA, Linn.

N. ORD.—LABIATÆ.
Tribe.—SATUREIÆ.
GENUS.—**MENTHA,*** LINN.
SEX. SYST.—DIDYNAMIA GYMNOSPERMIA.

MENTHA PIPERITA.

PEPPERMINT.

SYN.—MENTHA PIPERITA, SMITH, VAR. OFFICINALIS, KOCH; M. VIRIDI-AQUATICA, SHULTZ; M. OFFICINALIS AND HIRCINA, HULL; M. PALUSTRIS, RAII.

COM. NAMES.—PEPPERMINT; (FR.) MENTHE POIVREE; (GER.) PFEFFERMÜNZE.

A TINCTURE OF THE WHOLE PLANT MENTHA PIPERITA.

Description.—This glabrous or somewhat hairy, pungent, perennial herb, grows to a height of from 1 to 2 feet. *Rootstock* creeping, spreading, and multiplying; *stem* suberect. *Leaves* ovate-oblong to oblong-lanceolate, sharply serrate, acute, and rounded at the base; *petioles* distinct. *Inflorescence* in numerously glomeruled, terminal and superaxillary, leafless, and at last interrupted, ovate spikes; *flowers* small, distinctly pedicellate; *bracts* hispid, mostly longer than the verticillasters, the upper linear. *Calyx* campanulate, naked in the throat; *limb* 5-toothed; *teeth* hispid. *Corolla* 4-lobed, hardly irregular, except that the upper lobe, though never galeate nor concave, is broader than the others and emarginate; *tube* short, inclined. *Stamens* 4, included, similar and nearly equal, erect, straight, and distant; *anthers* 2-celled; *cells* parallel, without a thickened connective. *Style* long, exserted.

Labiatæ.—This large family of square-stalked aromatic herbs, and low shrubs, represented in North America by 50 genera, comprising 231 species and 45 recognized varieties, is characterized as follows: *Stems* square; *leaves* opposite, or sometimes verticillate, simple, and usually dotted with immersed glands filled with volatile oil; *stipules* none. *Inflorescence* thyrsoidal; the general evolution of the clusters in the axils of leaves or primary bracts centripetal; that of the cymes or glomerules centrifugal; the leaves being opposite and the clusters nearly or quite sessile, a whorl-like appearance is made (verticillaster); *flowers* perfect; *hypogynous disk* usually present, or represented by 1 or 4 gland-like lobes. *Calyx* tubular, gamosepalous. *Corolla* irregular and more or less bilabiate; *lobes* imbricated in the bud, the posterior or upper exterior, the middle lower innermost. *Stamens* didynamous or diandrous, borne upon the tube of the corolla, distinct or rarely monadelphous; the fifth, or anterior, and in diandrous species the adjacent pair also, rudimentary or sterile; rarely the four fertile stamens are equal. *Pistil* dimerous, each carpel deeply 2-parted or lobed; *ovary* 4-parted or lobed; *lobes* uniovulate; *ovules* mostly amphitropous or anatropous and erect; *style* filiform, mostly 2-cleft and 2-stigmatose at the apex. *Fruit* 4 akene-like nutlets, surrounding the base of the stigma, in the bottom of the persistent calyx; *nutlets* smooth or barely roughish. *Embryo* straight except in *Scutellarineæ; cotyledons* plane or plano-convex; *radicle* inferior; *albumen* slight or none.

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* Μίνθη, *Minthe*, daughter of Cocytus, whom, through jealousy, Proserpine changed into one of these plants.

The proven plants of this order, besides the six treated of in this work, are: the Mediterranean Germander (*Teucrium Marum*, Linn.), a noted feline aphrodisiac; the European, West Asiatic, and North African Pennyroyal (*Mentha pulegium*, Linn.), which is deemed emmenagogue, and antispasmodic; the South American Alfavaca (*Ocimum canum*, D. C.), which is used, in Brazil, as a sudorific, especially in diseases of the kidneys, bladder, and urethra; the East Indian *Ocimum Basilicum*, Linn., used by the natives as a palliative for the pains of parturition; Sweet Marjoram (*Origanum Marjorana*, Linn.), a cultivated form of *O. vulgare;* the Cape *Plectranthus fruticosus*, L. Herit.; the Mediterranean Rosemary (*Rosmarinus officinalis*, Linn.), an antihysteric and emmenagogue; and the European and Siberian Betony (*Stachys Betonica*, Benth.), a sternutatory, emetic and purgative.

A large number of species of this order have figured, more or less, in general and domestic practice, as stimulant, antispasmodic, carminatives, and jucunda for unpleasant drugs. A few of them only will be mentioned here, that the order may be well understood. The European, Asiatic, and African Lavender (*Lavendula vera*, D. C.), a carminative, antihysteric, and antiflatulent. The European Spearmint (*Mentha viridis*, Linn.), which is also considered stomachic; the European, Asiatic, and African Marjoram (*Origanum vulgare*, Linn.), a mild tonic, diaphoretic, and emmenagogue; and the Mediterranean Thyme (*Thymus vulgaris*, Linn.), lauded as a local stimulant and rubefacient, in carious teeth, rheumatism, sprains, etc. The leaves of the Mediterranean Sage (*Salvia officinalis*, Linn.), are well known as a light, bitter tonic, anti-emetic, diaphoretic, and astringent. The American Horsemint (*Monarda punctata*, Linn.), is considered diaphoretic, emmenagogue, diuretic, and rubefacient. The European and West Asiatic Catmint, or Catnip (*Nepeta Cataria*, Linn.), so well known in all country households, has been used, from time without date, as a stimulant, antispasmodic, and emmenagogue, in chlorosis, amenorrhœa, and various low type female disorders. Like Marum Verum it is a feline aphrodisiac. The European Horehound (*Marubium vulgare*, Linn.), is diaphoretic, diuretic, pectoral, and emmenagogue, and much used in confections, for asthma, phthisis, tussis, night-sweats, as well as in uterine and visceral affections. The South European Hyssop (*Hyssopus officinalis*, Linn.); Balm (*Melissa officinalis*, Linn.); Summer and Winter Savories (*Satureia hortensis*, and *montana*, Linn.); and Dittany of Crete (*Origanum Dictamnus*, Linn.), are all considered antiflatulent, antihysteric, antispasmodic, emmenagogue, etc., and are used in chlorosis, amenorrhœa, hypochondriasis, and kindred affections. The

European and Asiatic Motherwort (*Leonurus Cardiaca*, Linn.), which has but lately been brought before us, as Homœopaths, has been esteemed much, as the above species, beside being valued in Russia, as a remedy in rabies. The East Indian *Anisomeles Malabarica*, R. Br., is an excellent diaphoretic. The American Dittany (*Cunila mariana*, Linn.), was used, by the Aborigines, as an antiperiodic and alexiteric. The genus *Ocimum* furnishes plants of various properties; the Sierra Leone *viride*, Willd., and Indian *sanctum*, Linn., are febrifugal; the Japanese *crispus*, Thunb., antirheumatic, and the Indian *suave*, Willd., useful in infantile catarrh.

A number of the above species, and a multitude of others, are better known to the housewife and perfumer than to us as physicians.

History and Habitat.—Peppermint is nowhere considered truly indigenous, though probably its native haunt is the basin of the Mediterranean. It grows as an escaped plant in all European countries, as it does with us, in ditches and along brooks; there is nothing to prove that it is not a cultivated variety of *M. viridis*, into which it is said to revert if not properly reset. It was first said to be found in England about the year 1700, by Dr. Eales. The cultivation of the plant was begun in Great Britain about 1750, and on the Continent in 1770; it was afterward quite extensively planted in Surrey, Cambridgeshire, Lincolnshire, and Hertfordshire, in England; Sens, in France; Cölleda, in Germany; and New York, Ohio, and Michigan, in the United States. The yield of oil, for which alone the plant is cultivated, is from .5 to 1.5 per cent. of the production (from 8 to 16 lbs. per acre); and the annual product of the world is estimated at about 90,000 lbs.*

Peppermint began its usefulness, in medicine, at about the same period of its cultivation, and was then considered specific in renal and vesical calculus, dyspepsia, and diarrhœa; being considered a stomachic, tonic, stimulant, antispasmodic, and carminative. It was found useful in bowel troubles, especially those associated with flatulency, colic, retching, vomiting, spasmodic actions, and hysteria. Its rubefacient action is intimately associated with what may be considered anodyne properties, when the trouble is neuralgic or rheumatoid, and the affected nerves or muscles are somewhat superficial. Facial and sciatic affections are greatly relieved by fomentations of the leaves, or rubbing the oil, or menthol, directly over the course of the nerve itself; the action is temporary, but decidedly happy.

The principal use of the essence or oil is as a flavoring for confections, and a jucund ingredient of prescriptions containing nauseous, and especially griping drugs.

The leaves and tops are officinal in the U. S. Ph., as well as *Spiritus Menthæ Piperitæ*, and *Vinum Aromaticum*.† In Eclectic practice, the preparations are: *Aqua Menthæ Piperitæ*, *Extractum Rhei Fluidum*,‡ *Infusum Mentha Piperitæ*, *Mistura Camphoræ Composita*,§ *Mistura Cajeputi Composita*,‖ *Oleum Menthæ Piperitæ*, *Pulvis Rhei Compositus*,¶ *Tinctura Olei Menthæ Piperitæ*.

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* Todd, *Proc. Am. Pharm. Assoc.* 1876, 828.

† Lavender, Origanum, Peppermint, Rosemary, Sage, and Wormwood.

‡ Rhubarb and Peppermint.

§ Camphor, Opium, Peppermint, and Spearmint.

‖ Cajeput, Cloves, Peppermint, and Anise.

¶ Rhubarb, Bicarbonate Potash, and Peppermint.

PART USED AND PREPARATION.—The whole fresh, flowering plant is chopped and pounded to a pulp and weighed. Then two parts by weight of alcohol are taken, the pulp mixed thoroughly with one-sixth part of it, and the rest of the alcohol added. After stirring the whole well, and pouring it into a well-stoppered bottle, it is allowed to stand eight days in a dark, cool place.

The tincture, separated from this mass by pressure and filtration, should have a clear orange-brown color by transmitted light; retain the odor of the plant; have an oily feel; a bitterish, slightly astringent, mint-like taste; and an acid reaction.

CHEMICAL CONSTITUENTS.—*Oil of Peppermint.* This essential oil of the leaves is either colorless, pale yellow, or greenish, turning brown with age. It is liquid, has a sp. gr. of 0.84–0.92, boils at 188°–193° (370.4°–379.4° F.), has a strong, agreeable odor, and a powerful aromatic taste, at first biting, then cold, especially upon strong inhalation of air over the tongue; this effect is followed by a peculiar numbness characteristic of this product. The oil is soluble in water and in alcohol. It consists of a solid and liquid portion, and contains from 0.5 to 5 per cent. of a hydrocarbon ($C_{10}H_{18}$ + or — O), which is said to prevent the crystallization of menthol.

The oil of commerce is often adulterated with that of pennyroyal, with intent, or that of *Mentha arvensis*, *Erigeron Canadense*, or *Erechthites hieracifolia*, by carelessness. The tests for the oil are given by the *Oil and Drug News* as follows: On the addition to the oil of an equal part of a mixture of two parts chloral-hydrate, dissolved in one part of C. P. sulphuric acid and a drop or two of alcohol, a cherry-red coloration follows if the oil is pure; but, if pennyroyal is present, a dark olive-green color ensues; and D. Reagan says* that the pure oil is but slowly absorbed by blotting paper, but when the three plants above mentioned are mixed with it the absorption is rapid.

If the presence of the hydrocarbon above mentioned is very slight, the oil cooled to — 4 (+ 24. 8° F.) will deposit.

Pipmenthol,† $C_{10}H_{20}O$, a stearopten of the exquisite odor of Peppermint, composed of fine hexagonal crystals, melting at 36° (96.8° F.), and boiling at 210° (410° F.).‡

[*Menthol.*—Under this name is understood the Chinese Oil of Peppermint, which is distilled from *Mentha Javanica*, Bl., which is so pure that it almost wholly yields this product. Chinese menthol is very like that of other countries, but differs essentially in melting at 42° (107.6° F.), and boiling at 212° (413.6° F.). The import of this substance in 1884 was 4000 lbs., since when it has greatly increased.]

Menthene, $C_{10}H_{18}$.—On distilling menthol with phosphorous pentoxide, this body results as a levogyrate liquid, boiling at 163° (325.4° F.).

An almost odorless resin, and tannin, have also been determined.

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* *Am. Jour. Phar.*, 1885, 600.

† Peppermint Camphor.

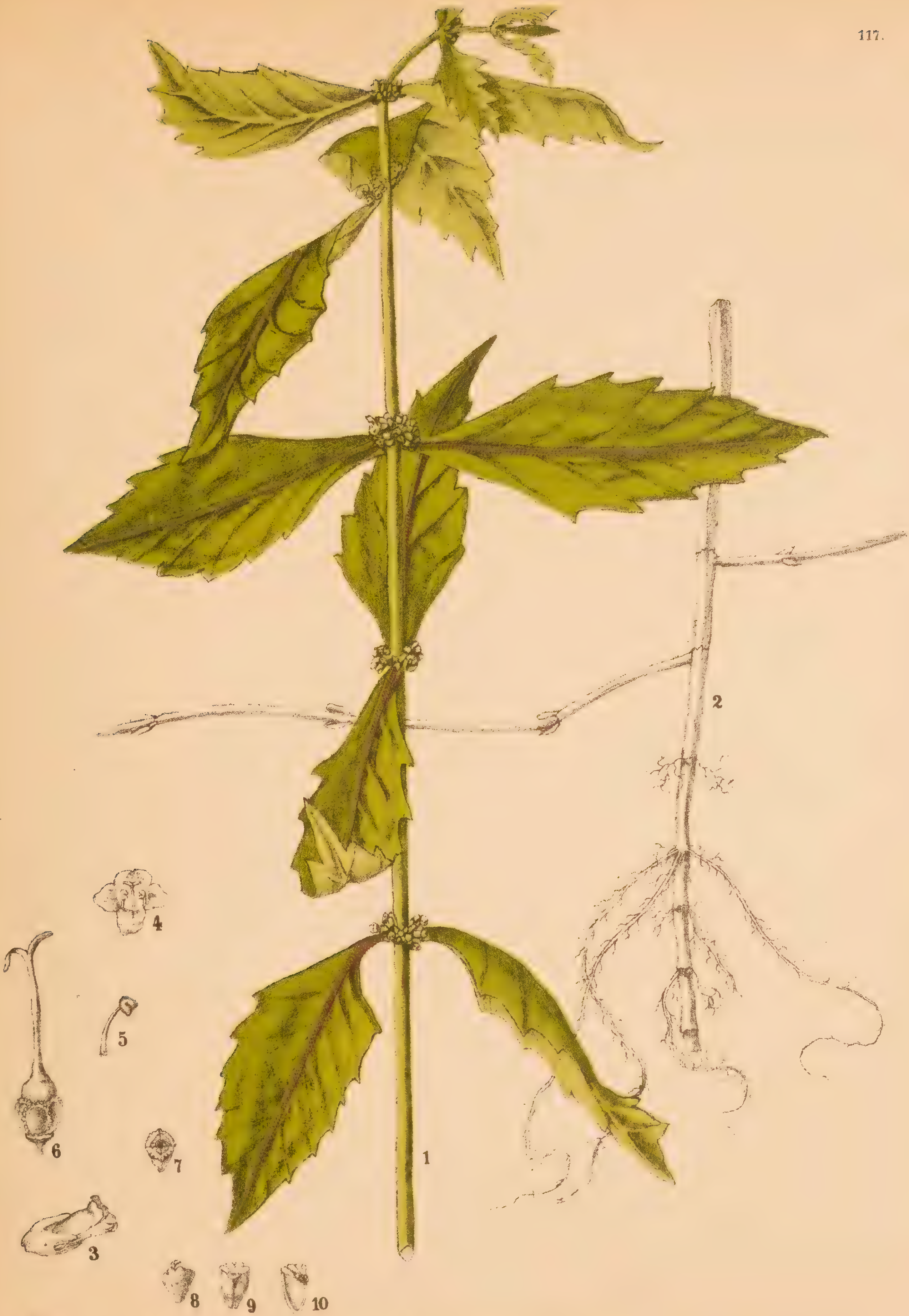
‡ Henry Trimble, *Am. Jour. Phar.*, 1883, 486.

PHYSIOLOGICAL ACTION.—The symptoms of disturbance caused in Dr. Demeures' experiments are substantially as follows: Headache, with confusion; shooting pains in the region of fifth-nerve terminals; throat dry and sensitive; dry cough on inspiration; and external muscular soreness of the neck. Dr. Demeures judges that this drug is to dry cough what arnica is to bruised and strained muscles.

DESCRIPTION OF PLATE 116.

1. End of an early flowering plant, Binghamton, N. Y., July 26th, 1885.
2. Flower.
3. Section of calyx.
4. Section of corolla.

(2–4 enlarged.)



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LÝCOPUS VIRGÍNICUS, Linn.

N. ORD.—LABIATÆ.
Tribe.—SATUREIEÆ.
GENUS.—**LYCOPUS**,* LINN.
SEX. SYST.—DIANDRIA MONOGYNIA.

LYCOPUS.

BUGLE-WEED.

SYN.—LYCOPUS VIRGINICUS, LINN.; L. UNIFLORUS, MICHX.; L. PUMILUS, VAHL.; L. MACROPHYLLUS, BENTH.; L. VIRGINICUS, VAR. PAUCIFLORUS, BENTH.; L. VIRGINICUS, VAR. MACROPHYLLUS, GRAY.

COM. NAMES.—BUGLE-WEED, WATER HOREHOUND, GIPSY-WEED, GIPSY-WORT, PAUL'S BETONY, WATER BUGLE; (FR.) LYCOPE DE VIRGINIE; (GER.) VIRGINISHER WOLFSFUSS.

A TINCTURE OF THE WHOLE HERB LYCOPUS VIRGINICUS, L.

Description.—This common perennial weed usually attains a growth of from 6 to 24 inches. *Stem* erect, obtusely angled, stoloniferous, and glabrous or very slightly pubescent; *stolons* long, filiform, often tuberous at the apex, produced from the base of the summer stems. *Leaves* ovate or oblong-lanceolate, coarsely serrate especially in the middle, acute at both ends, and tapering at the base into a short petiole. *Inflorescence* in sessile, axillary, capitate-verticillastrate glomerules; *bracts* very short, resembling the calyx-teeth; *flowers* whitish or tending toward purple. *Calyx* campanulate, only slightly shorter than the corolla, and naked in the throat; *teeth* 4 to 5, ovate or lance-ovate, obtuse or slightly acutish, 3-nerved. *Corolla* bell-shaped, small, short, and hardly irregular; *lobes* 4, nearly equal, the upper entire and broader than the others, but neither galeate or concave. *Stamens* inserted, straight, erect, equidistant, only two furnished with anthers; *anthers* with two parallel cells. *Style* bulbous at the base, bifurcating at the apex, the inner surfaces of the lobes stigmatic. *Fruit* composed of 4 3-sided nutlets, truncate at the top and acute at the base, the lateral margins thickened, the superior 4-crenated; *areola* basal, small.

History and Habitat.—The Virginian Bugle-weed is indigenous to North America, where it ranges from Labrador to Florida, Missouri, and northwestward to British Columbia and Oregon. It grows in low, damp, and shady grounds, and blossoms from July to September. This is one of the species that caused Rafinesque to vagarize, he disported with it to such an extent that it was forced to yield him 5 new species and 16 varieties "some of which might even be deemed species."

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* Λύκος, *Lykos*, wolf: πούς, *pous*, foot; from suppositional resemblance.

The medical history of this species seems to hang upon the laurels of *L. vulgaris* of Europe. It was first mentioned by Schoepf,[*] but Drs. Pendleton and Rogers[†] first presented it in tangible form as an agent in incipient phthisis with hemoptysis. Rafinesque[‡] thought exceeding well of its general properties, and as a means of producing diaphoresis without debility; he judged it a tonic sedative, and found it very useful in hemoptysis, and internal inflammation; he further claims that it acts somewhat like Digatalis, lowering the pulse, without producing any bad effects, nor accumulating in the system. Dr. Williams speaks of the plant[§] as being "one of the most valuable styptics (hemostatics?) we possess in our vegetable Materia Medica. Most writers accept the idea that the plant is narcotic; we, however, infer, both from our own experience and that of others, that it is only sedative in that it removes, by checking hemorrhage, that nervous excitability and mental fear always accompanying such conditions. It is certainly an excellent hemostatic, very useful in generous doses, striving for its primary effect in epistaxis, hemoptysis, hematemesis, and menorrhagia. But two days have passed, at this writing, since we checked one of the most serious cases of epistaxis in our practice by the exhibition of teaspoonful doses of the tincture, one drachm to the ounce of water, ten minutes between doses; three doses alone were sufficient, after two hours of hemorrhage and the patient (a healthy man) greatly reduced. Dr. King says,[§] Lycopus is decidedly beneficial in the treatment of diabetes, having cured when other means were useless, and has been of service in chronic diarrhœa and dysentery.

This valuable remedy was dismissed from the U. S. Phar. at the last revision; in the Eclectic Materia Medica the officinal preparation is *Infusum Lycopus.*

PART USED AND PREPARATION.—The whole fresh flowering herb is treated as in the preceding drug. The resulting tincture has a clear brown color by transmitted light; an herbaceous odor; an astringent and slightly bitter taste; and an acid reaction.

CHEMICAL CONSTITUENTS.—The analysis of the Tildens[||] determined the presence of a peculiar bitter principle, insoluble in ether, another soluble in ether, the two forming more than ten per cent. of the whole solid extract; tannin, and the usual plant constituents. The plant, according to the observations of myself and others, contains also a volatile oil. The properties of the plant are given up to water, and all seem to remain on drying except the last.

PHYSIOLOGICAL ACTION.—The symptoms caused in the human body by doses varying from ten drops to three drachms of the tincture, and of a wineglassful of the infusion[¶] all point to the drug as increasing the tonicity of the capillaries and diminishing the vis-a-tergo in the larger vessels and the action of the heart itself. The symptoms, other than those of circulation, were: Nausea; flatulence, griping, and diarrhœa; decrease of sp. gr. of urine to as low as 1004, with diminished quantity, causes deposits of mucus, but no albumen; fleeting rheumatic pains, and pleurodynia; sensations of cardiac constriction; slight fever; and sleeplessness.

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[*] *N. Y. Med. and Phys. Jour.*, I, 179.

[†] *Med. Flor.*, II, 20.

[‡] *Am. Med. Assoc.*, 1849, 902.

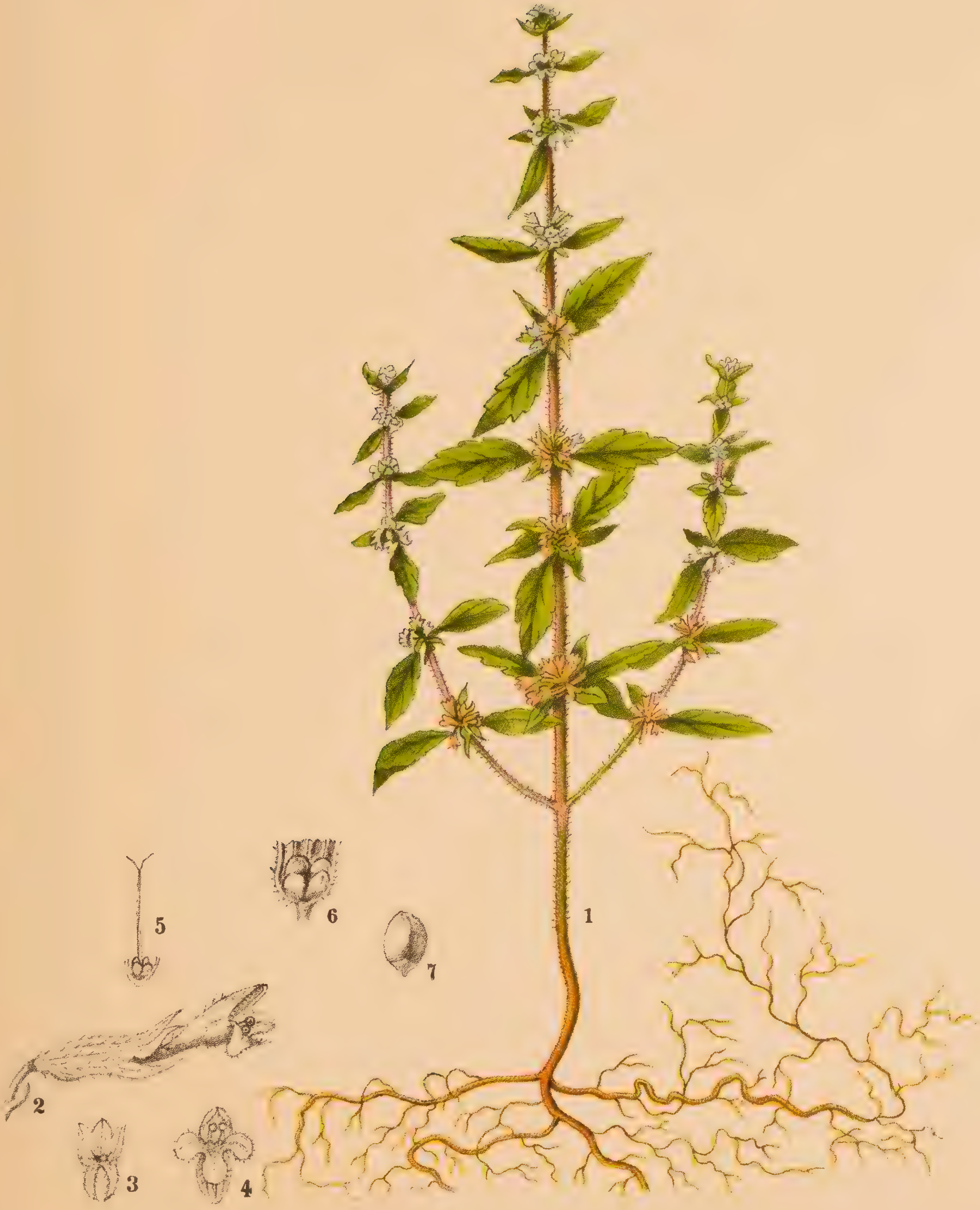
[§] *Am. Disp.*, 1870, 494.

[||] *Jour. of Mat. Med.*, vol. I, N. S. 1859, 326.

[¶] Allen, *Encyc. Mat. Med.* VI, 69.

Description of Plate 117.

1 and 2. Whole plant, Binghamton, N. Y., July 31, 1885.
3. Flower.
4. Face of corolla.
5. Stamen.
6. Pistil.
7. Fruit.
8. Akene, outer view.
9. Akene, inner view.
10. Akene, lateral view.



CM. ad nat. del. et pinxt.

HEDEÒMA PULEGIOIDES, Pers.

N. ORD.—LABIATÆ.
Tribe.—SATUREIEÆ.
GENUS.—**HEDEOMA**,[*] PERS.
SEX. SYST.—DIANDRIA MONOGYNIA.

HEDEOMA.

AMERICAN PENNYROYAL.

SYN.—HEDEOMA PULEGIOIDES, PERS.; MELISSA PULEGIOIDES, LINN.; CUNILA PULEGIOIDES, LINN.; ZIZIPHORA PULEGIOIDES, R. & S.
COM. NAMES.—MOCK PENNYROYAL, TICK-WEED, SQUAW MINT, STINKING BALM; (FR.) POULIOT D'AMERIQUE; (GER.) AMERIKANISCHER POLEY.

A TINCTURE OF THE WHOLE PLANT HEDEOMA PULEGIOIDES, PERS.

Description.—This common, annual herb, grows to a height of from 6 to 12 inches. *Stem* erect, minutely pubescent, branching; *hairs* retuse. *Leaves* oblong-ovate, obscurely serrate, the floral similar, all narrowed at the base into a slender petiole. *Inflorescence* in loose, few-flowered, axillary whorls, often having the appearance of terminal racemes; *flowers* very small, pedicillate. *Calyx* ovoid or tubular, gibbous at the base, 13-nerved, bearded in the throat, and more or less two-lipped; *upper-lip* 3-toothed, broad and spreading; *teeth* triangular; *lower-lip* 2-cleft, divisions setaceous-subulate, and hispid-ciliate. *Corolla* bluish, pubescent, scarcely exceeding the calyx; *tube* naked within; *limb* 2-lipped, the throat evenly open; *upper-lip* erect, flat, and notched at the apex; *lower-lip* spreading, 3-cleft. *Stamens* 4, the inferior (fertile) pair the longer; *fertile filaments* ascending parallel and under the upper-lip; *sterile* tipped with a little head, destitute of cells or pollen. *Anthers* of fertile stamens, 2-celled. *Fruiting calyx* ovate-campanulate, strongly gibbous, the throat closed with a ring of villous hairs. *Nutlets* 4, ovoid, brown, slightly compressed.

History and Habitat.—This species is indigenous to North America, where it ranges from Canada to Iowa, and southward. It grows upon the most arid spots of open woods and fields, and blossoms from July to September.

The American Pennyroyal differs largely from the European *Mentha pulegium* in its botanical characters, but its action, as a medicine, is very like it. Our species is extensively used, in domestic practice, as an aromatic stimulant and carminative in colic of children; a diaphoretic in the beginning of colds (Pennyroyal Tea); and in large doses of a hot infusion, together with the pediluvium, in amenorrhœa. In the latter trouble, if of recent occurrence, it will often bring on the menses nicely; and, combined with a gill of brewer's yeast, it frequently acts well as an abortivant, should the intender be not too late with her prescription. The oil is anti-emetic, anti-spasmodic, and rubefacient in rheumatism; with raw linseed oil, it makes an excellent dressing for recent burns. The oil has been recommended as an ointment to keep off gnats, ticks, fleas, and mosquitoes; many who have camped in the northern woods, have anointed their hands, neck, and face with this body, to guard against the pests of that region, but with only partial success.

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[*] Ἡδυόσμον, *hedyosmon*, from ἡδύς, *hedys*, sweet; οσμή, *osme*, smell.

The herb and *Oleum Hedeomæ* are officinal in the U. S. Ph.; in the Eclectic Dispensatory, the oil and *Decoctum Hedeomæ* are recommended.

PART USED AND PREPARATION.—The whole fresh plant, at the flowering period, is treated as described for the root of Collinsonia.[*] The resulting tincture has a deep orange color by transmitted light; retains the odor and taste of the plant to a high degree; and has an acid reaction.

CHEMICAL CONSTITUENTS.—*Oil of Hedeoma.*—This body is easily obtainable by distilling the fresh herb with water. It results as an almost colorless, light-yellow liquid, becoming darker with age. It retains the odor and taste of the herb, is neutral, has a sp. gr. of 0.941,[†] and is readily soluble in alcohol.

PHYSIOLOGICAL ACTION.—A case of poisoning by the oil is reported by Dr. Toothacker,[‡] of a woman who took, at intervals, doses of a teaspoonful of the oil; she presented the following symptoms: Severe headache; difficult deglutition; great nausea, severe retchings, but inability to vomit; intolerable bearing down, labor-like pains, with tenderness of the abdomen; constipation; dyspnœa; semi-paralysis of the limbs; nervous weakness, and prostration.

DESCRIPTION OF PLATE 118.

1. Whole plant, Binghamton, N. Y., July 21st, 1885.
2. Flower.
3. Calyx.
4. Mouth of corolla.
5. Pistil.
6. Fruiting calyx.
7. Nutlet.

(2–7 enlarged.)

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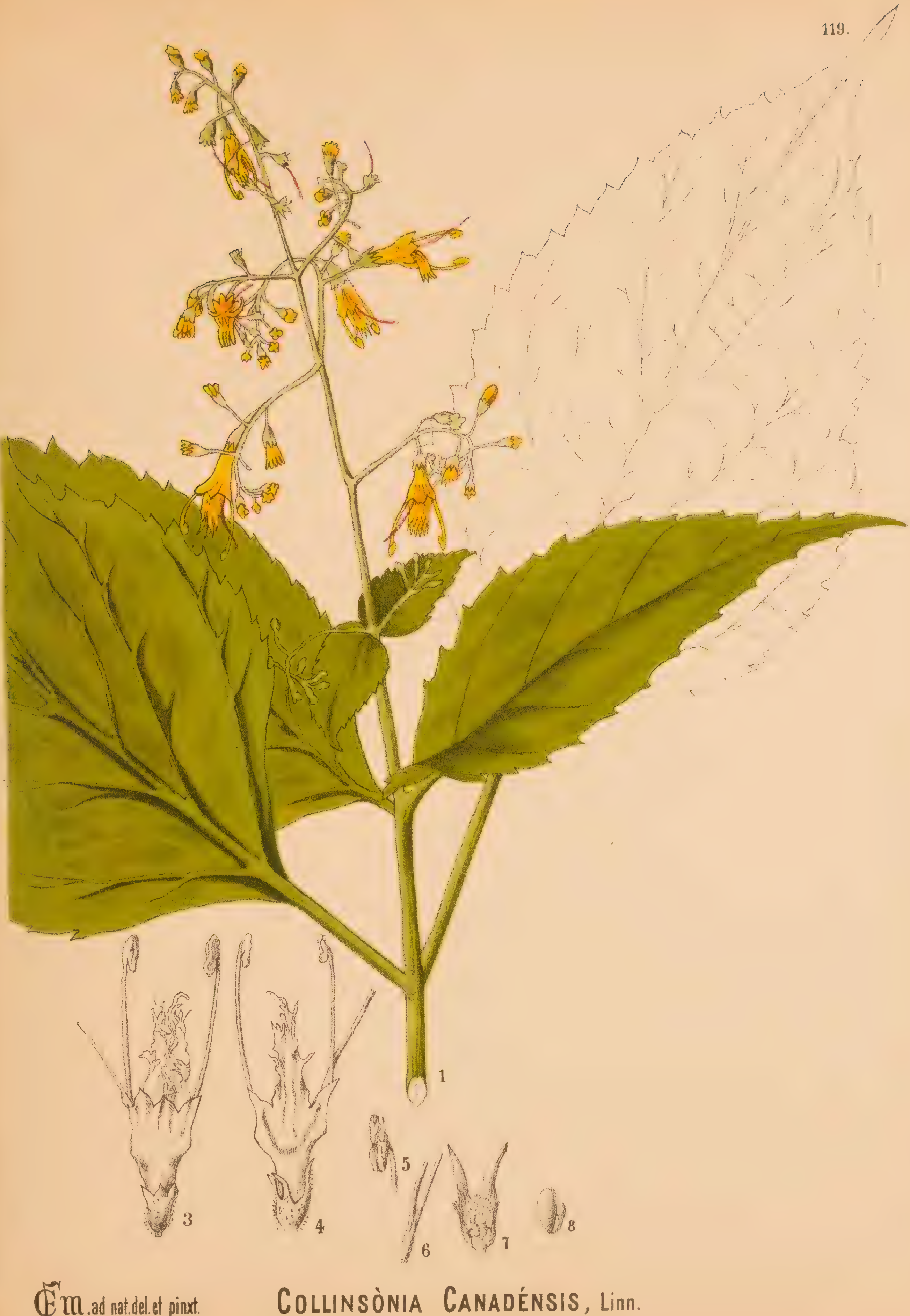
[*] Page 119-2.

[†] The sp. gr. of the oil of *Mentha pulegium* is 0.925.

[‡] *Phil. Jour. of Hom.*, 2, 655.



CFM.ad nat.del.et pinxt. **COLLINSÒNIA CANADÉNSIS**, Linn.

Tribe.—SATUREIEÆ.

GENUS.—**COLLINSONIA**,* LINN.

SEX. SYST.—DIANDRIA MONOGYNIA.

COLLINSONIA.

STONE-ROOT.

SYN.—COLLINSONIA CANADENSIS, LINN.; C. DECUSSATA, MŒN.; C. OVALIS, PURSH.

COM. NAMES.—STONE-ROOT, HORSE-WEED, HORSE-BALM, OX-BALM, KNOT-ROOT, KNOB-ROOT, GRAVEL-ROOT, RICH-WEED,† RICH-LEAF, HEAL-ALL,‡ HARDHACK;§ (FR.) BAUME DE CHEVAL; (GER.) CANADISCHE COLLINSONIE.

A TINCTURE OF THE ROOT OF COLLINSONIA CANADENSIS, LINN.

Description.—This glabrous perennial herb grows to a height of from 2 to 4 feet. *Root* nodular, depressed, and very hard and stone like; *stem* erect, somewhat 4-angled. *Leaves* opposite, petioled, ample, thin, varying from broadly ovate to oblong, tapering at the base, pointed at the apex, very veiny, and coarsely, sharply, and irregularly serrate. *Inflorescence* a naked, terminal, racemose, glandular-puberulent panicle; *flowers* lemon-yellow and lemon-scented. *Calyx* ovate, short, 10-nerved, lengthened in fruit, bearded midway in the throat, and containing a little honey-gland that partly surrounds, and is larger than, the two upper nutlets; *lips* 2, the upper flattened and 3-toothed, the lower 2-parted. *Corolla* elongated, somewhat infundibuliform, and having a bearded ring at the insertion of the filaments; *lips* 2, the lower larger, pendent, irregularly fimbriate, and bearded down the inner median line. *Stamens* 2 (the posterior pair wanting), much exserted, not declined, and spirally coiled in the bud; *filaments* long and straight, somewhat divergent; *anthers* introrse, 2-celled, the cells divaricate and contiguous. *Style* long, filiform, protruding toward one or the other stamen, and bifurcated at the apex into unequal lobes. *Seeds* triticose, carunculate.

History and Habitat.—The Stone-Root is indigenous to North America, where it ranges from Canada to Wisconsin, and southward to Florida, being particularly abundant in the North, and along the Allegheny Mountains. It habits rich woods, and flowers from July to September. The original specimen of this plant was sent to Peter Collinson, a promoter of science in England, by John Bartram, in 1735; he afterward forwarded it to Linnæus, who named the species in his honor.

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* In honor of Peter Collinson, F.L.S. (See "History and Habitat.")

† The true Rich-weed is *Pilea pumila*, Gray (Urticaceæ).

‡ Properly, *Brunella vulgaris*, Linn.

§ This vulgarism denotes *Spirea tomentosa*, Linn. (Roseaceæ).

Collinsonia was first introduced as a medicine by Schoepf, who praised its virtues in lochial colic, snake-bites, rheumatism, and dumb ague. Rafinesque states that the Aborigines used the plant as a vulnerary, and that Dr. Mease claimed to cure dropsy with an infusion of the root in cider;* he further states that, "in the mountains of Virginia, Kentucky, Tennessee, and Carolina, this genus is considered as a panacea, and used outwardly and inwardly in many disorders; it is applied in poultice and wash for bruises, sores, blows, falls, wounds, sprains, contusions, and taken like tea for headaches, colics, cramps, dropsy, indigestion, etc." Drs. A. French and Beers speak highly of it in pains of the bladder, ascites, and dropsy of the ovaries; also as a powerful tonic in putrid and malignant fevers, and in leucorrhœa. Dr. Hooker judges the principle so volatile that all infusions should be made in a tight vessel. Dr. Scudder speaks highly of the plant in chronic diseases of the respiratory tract, and says that it relieves pulmonary irritation, and acts as a stimulant expectorant. "In irritation of the pneumogastric nerve," he says, "heart disease, and that peculiarly distressing asthma simulating, and sometimes attending, phthisis, it has a superior influence in quieting irritation, giving increased strength to the patient. In hemorrhoids, where there is rectal irritation, with the feces in part scybalous and part semifluid, no constipation being present, it cures in doses of from one to two drops of the tincture in water, three or four times a day."

The officinal preparations in the Eclectic Materia Medica are: *Infusum Collinsonæ* and *Tinctura Collinsonæ*.

PART USED AND PREPARATION.—The fresh root is chopped and pounded to a pulp and weighed. Then two parts by weight of alcohol are taken, the pulp mixed thoroughly with one-sixth part of it, and the rest of the alcohol added. After stirring the whole well, it is poured into a well-stoppered bottle, and allowed to stand eight days in a dark, cool place. The tincture so prepared is, after straining and filtering, of a brilliant reddish-orange color by transmitted light; has no characteristic odor; a ligneous taste; and an acid reaction.

CHEMICAL CONSTITUENTS.—An analysis of the root and leaves of this species, by C. N. Lochman,† resulted in the separation of a resin soluble in ether and partly in alcohol, wax, tannin, mucilage, and starch. A volatile oil is also present. The *collinsonin* of the pharmacies is the solid matter of the root, combined with chloride of sodium—not a specific principle, as might be supposed.

PHYSIOLOGICAL ACTION.—Dr. Dowle's experiment,‡ in which he took a teaspoonful and a half of the powder, gave the following symptoms: Numbness of the face and arms, with a sensation of enlargement of the parts; nausea; faintness and giddiness; an exhilaration something like that of whiskey; increased urine; and scybalous stool. Dr. E. M. Hale's provings add to the above the following effects: Headache with throbbing; yellow-coated tongue; vomiting; colic with desire for stool; and copious yellow bilious stools with tenesmus.

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* Dr. Mease's account of the drug is set forth in his *Enclyclopædia*, vol. II, 177.

† *Am. Jour. Phar.*, 1885, 228.

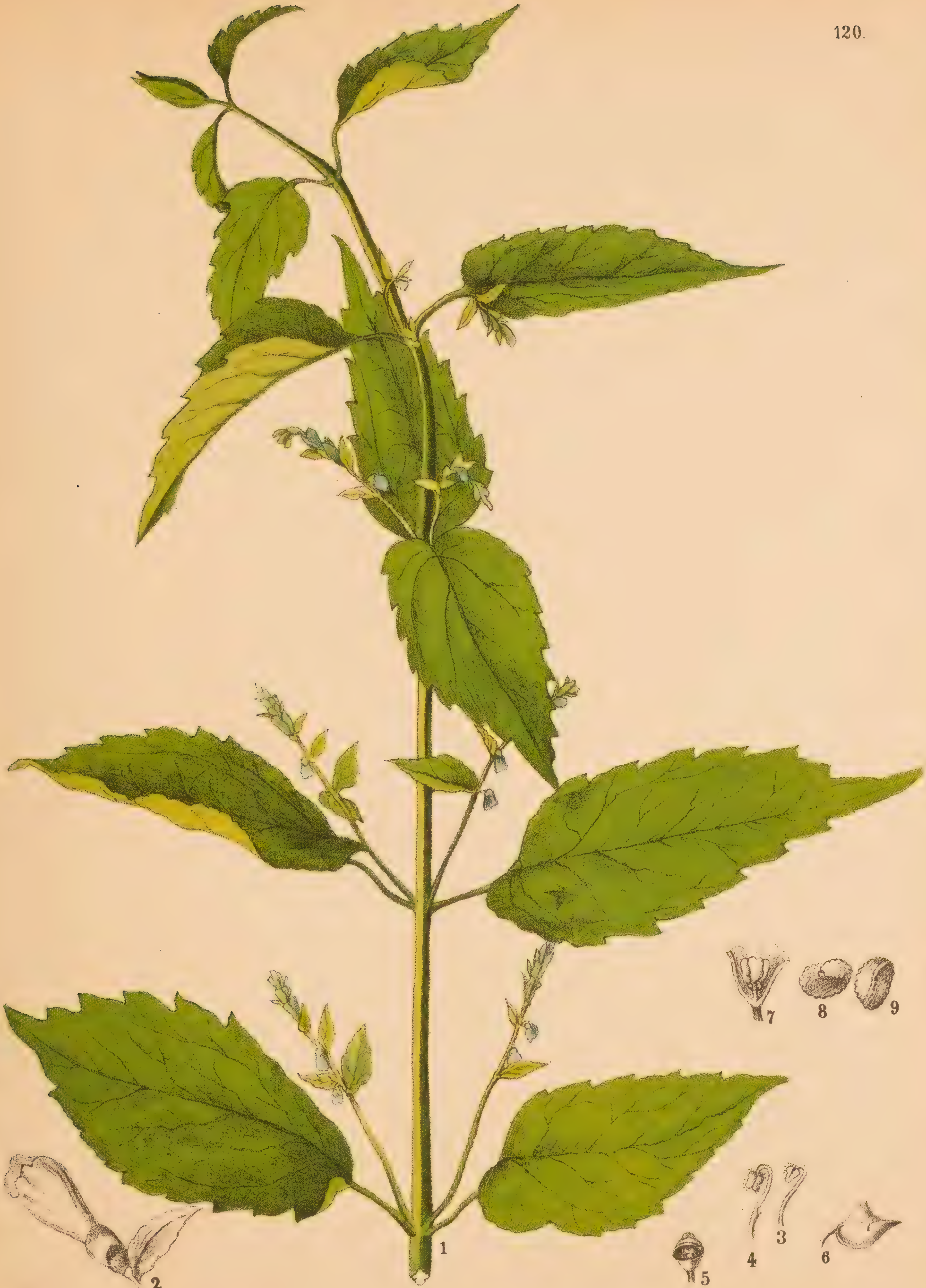
‡ *U. S. Med. Investigator.*

Collinsonia appears to act as an irritant to the pneumogastric and vaso-motor nerves, and to mucous membranes in general, increasing the secretions of the latter, and causing inflammatory action to follow the congestion excited by its action.

DESCRIPTION OF PLATE 119.

1. Top of a flowering plant, Binghamton, N. Y., July 2d, 1885.
3. Under surface of a flower.
4. Upper surface.
5. Anther.
6. Stigmas.
7. Calyx in section.
8. Seed.

(3–8 enlarged.)



C.F.M. ad nat del et pinxt.

SCUTELLÀRIA LATERIFLÒRA, Linn.

Tribe.—STACHYDEÆ.

GENUS.—**SCUTELLARIA**,* LINN.

SEX. SYST.—DIDYNAMIA GYMNOSPERMIA.

SCUTELLARIA.

SKULL CAP.

SYN.—SCUTELLARIA LATERIFOLIA, LINN.

COM. NAMES.—VIRGINIAN SKULL CAP, MAD-DOG SKULL CAP, HOODWORT, MAD-WEED, MAD-DOG WEED, BLUE PIMPERNEL; (FR.) SCUTELLAIRE; (GR.) HELMKRAUT.

A TINCTURE OF THE WHOLE PLANT SCUTELLARIA LATERIFOLIA, LINN.

Description.—This common perennial herb grows to a height of from 1 to 2 feet. *Root* fibrous; *stem* 4-sided, smooth, except upon the softly pubescent angles, upright, and much branched or simple. *Leaves* opposite, ovate-lanceolate or ovate-oblong, pointed, closely serrate, and rounded or somewhat cordate at the base; *petioles* about one-fourth the length of the blade. *Inflorescence* in opposite, axillary, unilateral, leafy racemes; *leaves*, first pair similar to those of the stem, the rest gradually reduced to bracts; *flowers* small, blue, single, in the axils of the floral leaves. *Calyx* in anthesis campanulate, 2-lipped; *lips* entire. *Corolla* bilabiate, erect; *tube* elongated, curved upward, dilated at the throat, and naked within; *lips* short, equal in length, the upper arched and having two lateral divisions connected with its basal sides, the lower spreading, convex, notched at the apex. *Stamens* 4, parallel, ascending under the upper lip, the superior pair shorter; *anthers* approximated in pairs, ciliate, those of the lower pair 1-celled by abortion, the upper 2-celled and cordate. *Style* 2-forked, the upper arm wanting or very small. *Fruiting calyx* closed, the upper lip with a helmet-like, and at length concave and enlarged, appendage on the back, the whole splitting at maturity, the upper lip usually falling away. *Nutlets* 4, wingless, depressed, tubercular, and situated upon a slightly elevated and bent gyno-base, inclining the fruit to the upper sepal; *seed* transverse; *embryo* curved; *radicle* short, incumbent upon one of the cotyledons.

History and Habitat.—Scutellaria is indigenous to North America, where it ranges from Canada to Florida and westward to British Columbia, Oregon, and New Mexico; it habits the borders of wet places, and flowers during July and August.

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* *Scutella*, a saucer or shallow dish, alluding to the fruiting calyx.

About the first introduction of this plant into medicine was the experiments of Dr. Vandesveer, in 1772, who claimed to have found it curative and prophylactic in canine rabies, his reported cases being fourteen hundred; this seems a large number to fall to the lot of one physician; his son after him claimed the cure of forty cases more in three years. On account of the apparently slight properties inherent in this species by physical examination its worthiness was greatly doubted and the plant much railed against, even by many who never tried it. Following Vandesveer, many empirics and regulars used the remedy with success, while many others wrote essays against its being relied upon as an antihydrophobic. Dr. White, of Fishkill, assured Rafinesque that the plant preserved him from rabies after being bitten by a dog from whose bite others died. Rafinesque states his full belief in the prophylactic prowess of the plant, and adds that many laymen and physicians claim that the plant never fails to ward off or cure the disease. The dose given was a gill of the infusion four times a day, and the plant applied to the wound. Dr. S. W. Williams, whose cry of "charlatan" and "quack" was always raised upon the slightest pretext, lends his support to the probable virtue of the plant. Mr. Youatt, a distinguished veterinary surgeon, spoke highly of its virtues in this direction, but omitted it entirely from his treatise on canine rabies. The natural order Labiatæ yields species of many of its genera that are valued by the aborigines of countries in which they grow as antihydrophobics. Some value should at least be considered under these circumstances, as native medication is always the result of long and more or less successful experiment.

The plant has proved itself a useful antispasmodic, nervine, and tonic in chorea, convulsions, tetanus, tremors, delirium tremens, wakefulness in chronic disorders, and many other diseases when a tonic combining nervine powers might be deemed necessary; it is also considered diaphoretic and diuretic.

Scutellaria is officinal in the U. S. Ph. as *Extractum Scutellariæ Fluidum;* in the Eclectic Materia Medica it is recommended in the same preparation as well as *Extractum Scutellariæ Alcoholicum*, *Infusum Scutellariæ*, *Extractum Scutellariæ Composita*,* and *Pilulæ Valerianæ Compositæ*.†

PART USED AND PREPARATION.—The whole fresh blossoming plant, gathered in August, when fruiting is well advanced, is treated as in the preceding species.‡ The resulting tincture is opaque. In thin layers it has a deep brown color by transmitted light: its taste is extremely bitter and very astringent; and its reaction acid.

CHEMICAL CONSTITUENTS.—According to the analysis of Cadet, this species contains: α, a greenish-yellow fixed oil, soluble in ether; β, an essential oil; γ, a bitter principle, soluble in water, alcohol, and ether; δ, a peculiar volatile matter; ε, a peculiar astringent principle; ξ, albumen; η, a sweet mucoid body; and the usual plant constituents.

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* Scutellaria, Cypripedium, Humulus, and Lactuca.

† Scutellaria, Valeriana, Chamomilla, Eupatorium, Quinine, and Capsicum.

‡ Page 119-2.

[*Scutellarine.*[*]—This unclassifiable substance is a precipitate, by alum, of the evaporated tincture made with 76 per cent. alcohol, after dilution with several times its bulk of water. It results as a neutral non-resin, in the form of a greenish[†]-brown, gritty, resinous powder, insoluble in water, and partly soluble in alcohol and ether. It is said to retain the activity of the plant as far as known.]

PHYSIOLOGICAL ACTION.—Gordon's experiments with from 10 to 60 drops of the tincture resulted substantially as follows: Mental confusion and stupor; headache and vertigo; photophobia with dilated pupils; scanty urine, with difficult micturition; variable pulse with final reduction of the heart's action from 70–72 to 52 with intermission; general languor and tremulousness; followed by wakefulness and restlessness.

DESCRIPTION OF PLATE 120.

1. Upper portion of plant, Binghamton, N. Y., July 31st, 1886.
2. Flower.
3. Lower } stamen.
4. Upper } stamen.
5. Calyx.
6. Fruiting calyx.
7. Fruiting calyx, showing fruit.

8 and 9. Nutlets.

(2–9 enlarged.)

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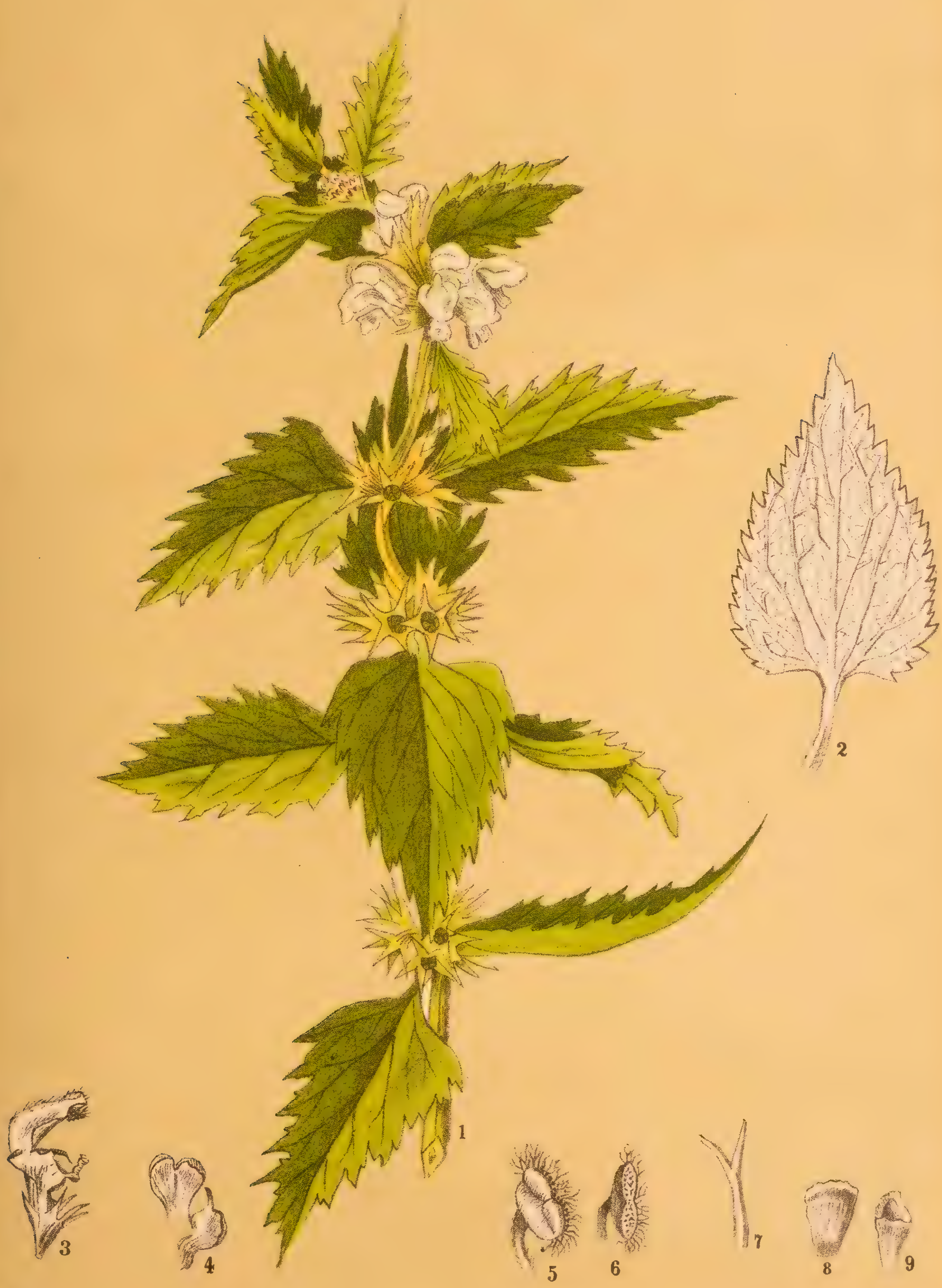
[*] Scutelline, so called, is valueless.

[†] Chlorophyll.



C.M. ad nat del. et pinxt.

LÀMIUM ÁLBUM, Linn.

N. ORD.—LABIATÆ.
Tribe.—STACHYDEÆ.
GENUS.—**LAMIUM**,* TOURN.
SEX. SXST.—DIDYNAMIA GYMNOSPERMA.

LAMIUM.

DEAD NETTLE.

SYN.—LAMIUM ALBUM, LINN.
COM. NAMES.—DEAD NETTLE, WHITE ARCHANGEL; (FR.) L'ORTIE BLANCHE; (GER.) WEISSE TAUBNESSEL, WEISSBIENENSANG.

A TINCTURE OF THE LEAVES AND FLOWERS OF LAMIUM ALBUM, LINN.

Description—This more or less erect, hairy, and very leafy perennial herb, grows to a height of 1 foot or more. *Stem* decumbent at the base. *Leaves* ovate, acuminate, coarsely and doubly serrate, with a cordate or truncate base; *petioles* manifest upon the upper, and long, upon the lower part of the plant. *Inflorescence* in several axillary whorls; *flowers* large. *Calyx* tubular-campanulate, about 5-nerved; *teeth* 5, nearly equal, very slender, and awl-pointed, but not spinescent. *Corolla* white, about 1 inch long; *tube* curved upward from an obliquely-contracted base, having a ring of hairs inside; *throat* rather narrow; *upper lip* oblong, fornicate, narrowed at the base; *lateral lips* small, broadened down to the throat, and each bearing upon its upper margin a spur-like appendage that appears like a projection from the throat; *lower lip* spreading, 3-lobed, the middle lobe notched at the apex, and contracted into an almost stipitate claw at the base. *Stamens* 4, ascending under the galeate upper lip of the corolla, and not deflexed after anthesis, the anterior (inferior) pair longer, both pairs parallel and fertile; *anthers* hirsute, approximate in pairs; *cells* 2, divergent, opening lengthwise. *Style* filiform, forked at the apex into 2 divergent, stigmatose, pointed lobes. *Nutlets* somewhat triquetrous, sharply 3-angled, truncate, and hollowed out at the apex.

History and Habitat.—The Dead Nettle comes to us from Great Britain, France, and Germany, where it grows in waste places and along hedges; with us it is becoming naturalized in Eastern New England, where it takes up its usual habitat, and blossoms in July and August.

The very unpleasant odor and bitter taste of this species causes it to be exempt from use by grazing cattle; yet Linnæus says that in Sweden it is gathered by the peasants and cooked as a pot-herb, the process of boiling dissipating, in the most part, the principles of the plant.

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* Λαῖμος, *laimos*, the throat, alluding to the ringent corolla; or *lamia*, a witch, hag, or demon, to which the flower is likened in appearance.

Although this plant has been used from ancient times, and is mentioned by Dioscorides and Pliny, yet it has received but little thought or experiment. The principal uses as a drug are all mentioned in a few words by Gerarde, who says:* "Archangel, stamped with vinegar, and applied in manner of a pultis, taketh away Wens and hard swellings; the King's Evill, inflammation of the kernels under the ears and jawes, and also hot fierie inflammation of the kernels of the necke, armholes, and flanks. It is good to bathe those parts with the decoction of it . . . . . The later Phisitions thinke that the white flowers do staie the whites, and for the same purpose divers do make of them a conserve."

PART USED AND PREPARATION.—Two parts of the fresh leaves, and one part of the fresh blossoms are to be chopped and pounded to a pulp, enclosed in a piece of new linen, and subjected to pressure. The expressed juice should then be thoroughly mixed with an equal part by weight of alcohol. After allowing the mass to macerate eight days in a well-stoppered bottle, in a dark, cool place, the tincture may be separated by filtration. This tincture should be opaque. In thin layers, it has a reddish-brown color by transmitted light; its odor is sourish and herbaceous, reminding one of old buckweat honey-comb; its taste very like its odor, and followed by a bitterishness; and its reaction strongly acid.

CHEMICAL CONSTITUENTS.—Lamium contains a bitter principle and a volatile oil, but neither have as yet been isolated.

PHYSIOLOGICAL ACTION.—Little is known of the action of this plant, the provings of Hahnemann and others giving few characteristic symptoms. Its action seems to be spent upon the mucous membranes in general, and upon the female generative organs in particular, where it causes a sort of inflammatory excitement.

DESCRIPTION OF PLATE 121.

1. Top of plant, from Salem, Mass., Aug. 6th, 1885.
2. A leaf, under surface.
3. Flower.
4. A portion of the corolla, showing the appendage.

5 and 6. Anthers.

7. Stigma.

8 and 9. Carpels.

(3–9 enlarged.)

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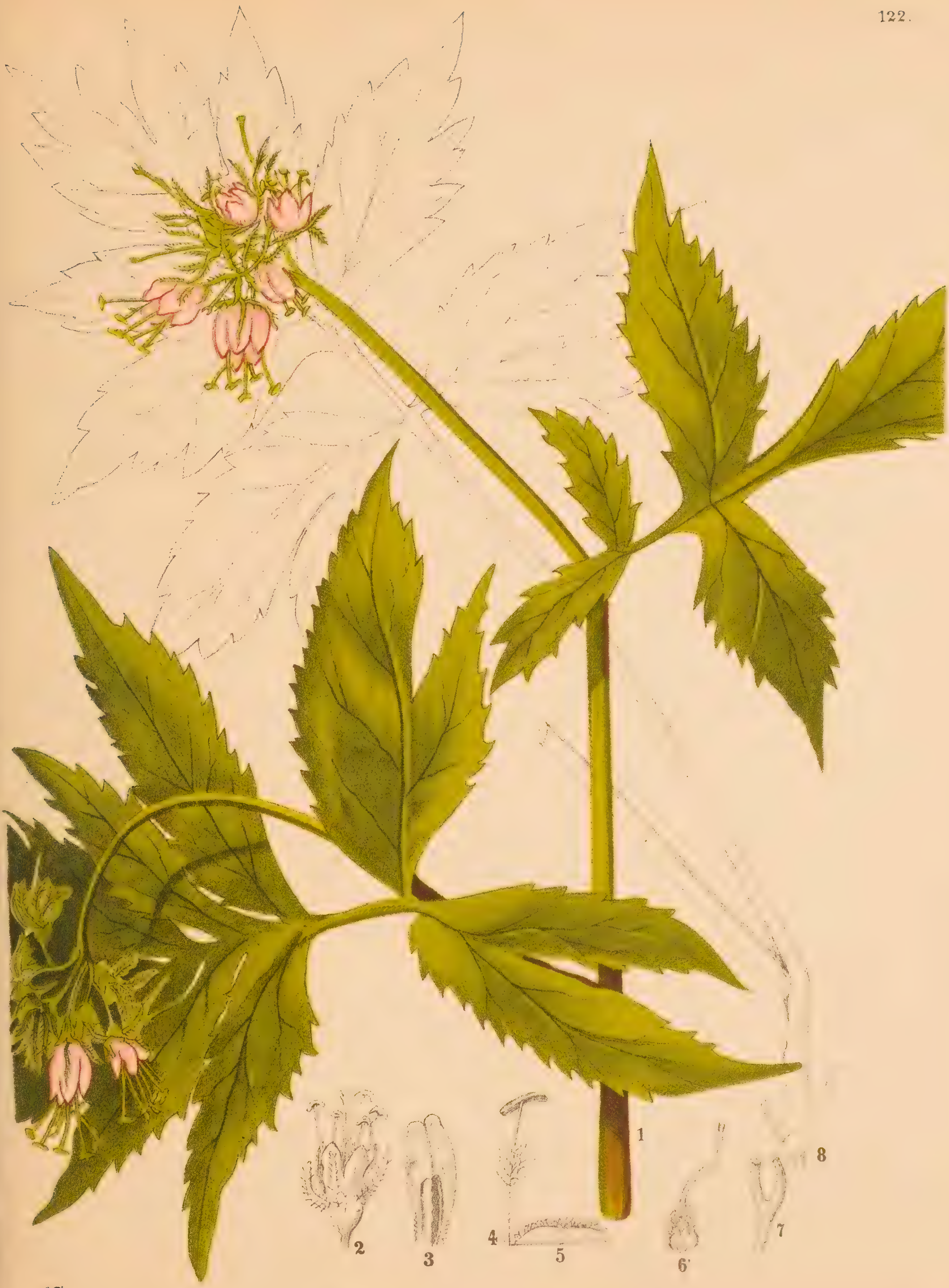
* *Herball*, p. 568.



C.F.M. ad nat del. et pinxt.

HYDROPHÝLLUM VIRGÍNICUM, Linn.

Tribe.—HYDROPHYLLEÆ.

GENUS.—**HYDROPHYLLUM**,* TOURN.

SEX. SYST.—PENTANDRIA MONOGYNIA.

HYDROPHYLLUM.

WATERLEAF.

SYN.—HYDROPHYLLUM VIRGINICUM, LINN.
COM. NAMES.—VIRGINIAN WATERLEAF, BURR FLOWER.

A TINCTURE OF THE WHOLE FRESH PLANT HYDROPHYLLUM VIRGINICUM, LINN.

Description.—This smoothish perennial herb grows to a height of from 1 to 2 feet. *Rootstock* creeping, scaly-toothed by the withered sheathes of previous stems. *Stems* generally simple, sometimes 2-forked; *leaves* ample, pinnately divided, and conspicuously petioled; *leaflets* 5 to 7, ovate-lanceolate or oblong in general outline, sharply and irregularly cut-toothed, the lower pair mostly 2-parted, the upper three confluent, all acuminate or acute. *Inflorescence* in terminal and upper axillary cymose clusters; *flowers* pinkish-white; *peduncles* forked, longer than the petioles of the leaves from whose axils they spring. *Calyx* deeply 5-parted, naked at the sinuses; *teeth* narrowly linear, bristly ciliate. *Corolla* campanulate, 5-cleft, the lobes convolute in the bud; *tube* furnished with five adnate appendages fixed to the midrib of each petaloid lobe, the incurved free margins approximated by interlocked hairs, thus forming a sort of nectariferous tube. *Stamens* exserted; *filaments* long, filiform, bearded about the middle by a few long hairs; *anthers* linear, versatile. *Ovary* bristly hairy, 1-celled; *ovules* amphitropous, enveloped by the dilated fleshy placentæ. *Style* exserted, bifurcated at the summit; *stigmas* 2, capitate, minute. *Fruit* a spherical, loculicidal capsule about the size of a pea. *Seeds* 4, or generally fewer by abortion; *testa* pitted or reticulated; *albumen* cartilaginous.

Hydrophyllaceæ.—This large and innocent family of commonly hairy herbs is represented in North America by 14 genera, comprising 115 species, and 17 recognized varieties. *Leaves* mostly alternate; *stipules* absent. *Inflorescence* in more or less unilateral, mostly bractless cymes or scorpioid racemes; *flowers* regular, 5-merous and 5-androus, blue or white. *Calyx* sometimes with nearly separate sepals, the sinuses often appendaged. *Stamens* borne on the base of the corolla and alternate with its lobes. *Ovary* entire, 1-celled, or sometimes 2-celled by union of the placentæ in the axis; *placentæ* 2, parietal; *ovules* amphitropous or anatropous, pendulous or nearly horizontal. *Styles* 2, or single and 2-cleft. *Fruit* a 2-valved, 2 to many-seeded capsule; *seeds* pitted or reticulated; *embryo* small; *albumen* copious.

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* ὕδωρ, *hudor*, water; φυλλον, *phyllon*, leaf; the application doubtful.

History and Habitat.—The Waterleaf is indigenous to North America, where it ranges from Canada southward to the mountains of North Carolina and northward to Alaska, seeking moist, shady grounds, and flowering from June to August. The young leaves serve in some localities as a salad, called Shawanese Lettuce, and are eaten as a potage in other places, under the name of John's Cabbage. We have no previous medical history of this plant, or any other species of the order.

PART USED AND PREPARATION.—The fresh flowering plant is chopped and pounded to a pulp and weighed. Then two parts by weight of alcohol are taken, the pulp mixed thoroughly with one-sixth part of it, and the rest of the alcohol added. After stirring the whole well, it is poured into a well-stoppered bottle, and allowed to macerate for eight days in a dark, cool place. The tincture thus formed after filtration has a deep crimson-brown color by transmitted light, a peculiar bitterish odor, an astringent taste, and an acid reaction.

PHYSIOLOGICAL ACTION.—The only account of the action of this plant is that furnished by Dr. P. B. Hoyt,* who records the following symptoms caused in himself: Dull headache; burning, smarting, and itching of the eyelids with profuse lachrymation; agglutination of the lids in the morning; injection of the sclera, and photophobia.

DESCRIPTION OF PLATE 122.

1. End of flowering plant, Binghamton, N. Y., June 1st, 1885.
2. Flower.
3. Petal and appendage.
4. Stamen.
5. Nectary.
6. Pistil.
7. Style and stigmas.
8. Leaf.

(3–7 enlarged.)

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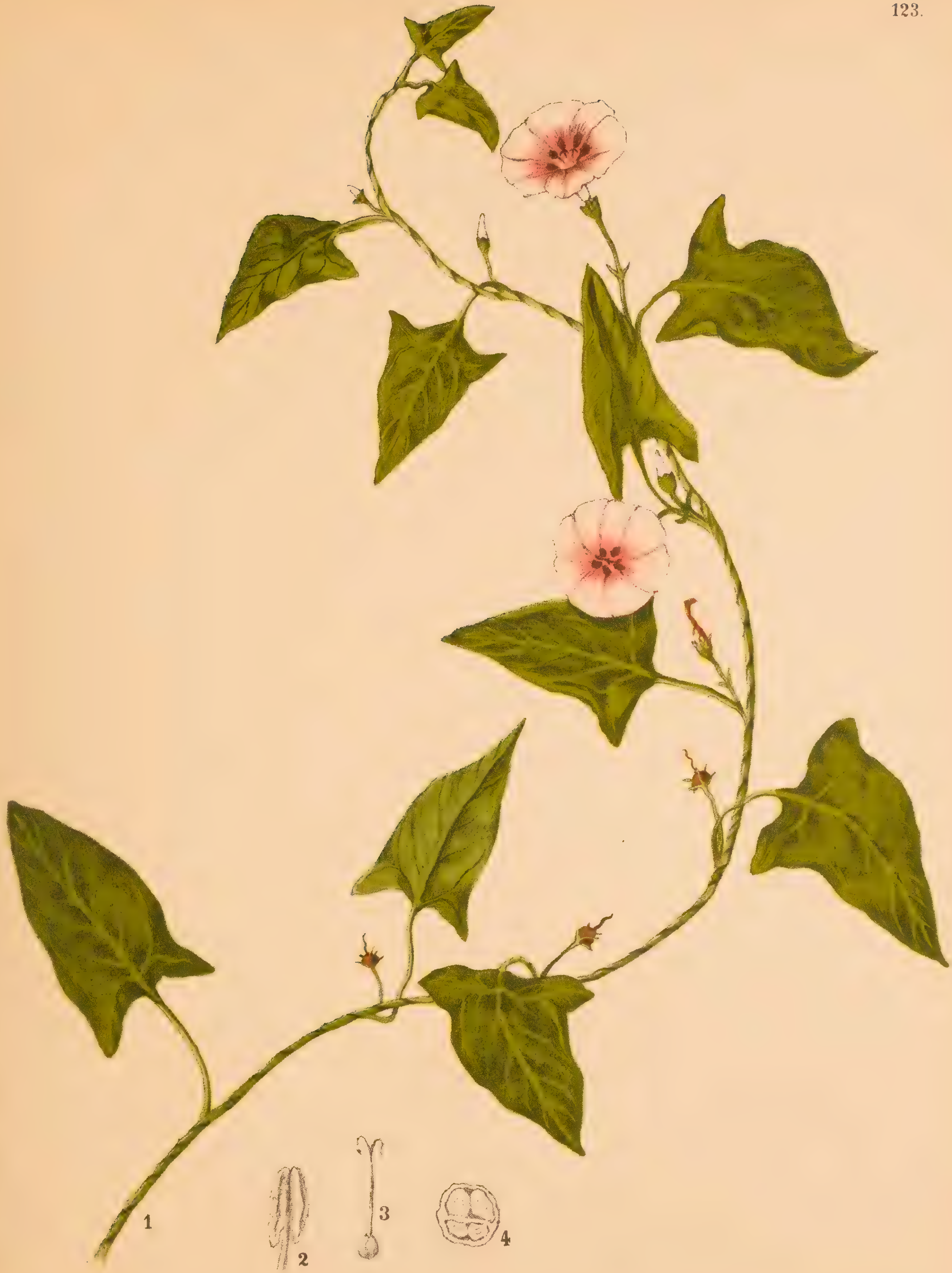
* *Am. Hom. Obs.*, xi, 101.



ℭ𝔪.ad nat.del.et pinxt.

CONVÓLVULUS ARVÉNSIS, Linn.

Tribe.—CONVOLVULEÆ.

GENUS—**CONVOLVULUS**,* LINN.

SEX. SYST.—PENTANDRIA MONOGYNIA.

CONVOLVULUS.

BINDWEED.

SYN.—CONVOLVULUS ARVENSIS, LINN.
COM. NAMES.—BINDWEED; (FR.) LE LISERON; (GER.) DIE WINDE.

A TINCTURE OF THE WHOLE PLANT CONVOLVULUS ARVENSIS, L.

Description.—This low perennial attains a growth of from 2 to 5 feet. *Root* deeply and extensively creeping; *stem* nearly glabrous, procumbent or twining over surroundings; *leaves* ovate-oblong, sagittate tending to hastate, entire, the basal auriculate lobes acute. *Inflorescence* axillary; *peduncles* mostly 1-flowered *flowers* matinal, white tinged with rose; *bracts* remote from the flower, subulate. *Calyx* naked at the base; *sepals* equal, rounded. *Corolla* about three-quarters of an inch long, open infundibuliform, more or less plicate at the sinuses and obscurely 5-notched. *Stamens* included; *filaments* dilated at the base. *Ovary* entire; *style* single, persistent; *stigmas* 2, filiform, mostly spreading or revolute. *Fruit* a 2-celled globose capsule. *Seeds* 2 in each cell; *cotyledons* broad, foliaceous.

Convolvulaceæ.—This large and well-distinguished family of mostly tropical or subtropical plants, is represented in North America by 8 genera, containing in all 73 species and 17 recognized varieties. The order is composed of herbs or shrubs with stems that generally twine or trail. *Leaves* alternate, petioled (absent in *Cuscuta*); *stipules* none. *Inflorescence* truly axillary, the peduncles 1-flowered or cymosely 3- many-flowered; *flowers* regular and perfect, 5-merous or rarely 4-merous. *Calyx* persistent; *sepals* mostly distinct, imbricated. *Corolla* with an entire or lobed limb. *Gynœcium* generally 2-carpelled. *Stamens* as many as the lobes of the corolla and inserted low upon its tube. *Hypogynous disk* evident, annular. *Ovary* 2- to 6-celled; *style* single, sometimes divided; *stigma* terminal or introrse. *Fruit* capsular or fleshy; *seeds* comparatively large; *embryo* filling the testa; *albumen* mucilaginous, surrounding, or surrounded by, the embryo.

In this order our proven plants are: The Oriental Scammony (*Convolvulus Scammonia*, Linn.), whose root yields an irritant but nearly tasteless purgative, often given to children as an anthelmintic on account of the smallness of the requisite dose for purging; Jalap, the dried tubercules of the Mexican *Exogonium Purga*, Benth., is a certain, powerful, and speedy drastic purgative used as above;

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* From *convolvulo*, to twine.

it has a griping effect, however, making it less pleasant than Scammony; and Convolvulus Duartinus, the common Morning Glory (*Ipomæa Bona-nox*, Linn.), a native of the tropics, so extensively planted north as an ornamental "vine."

Many other genera furnish plants more or less used in general medicine, viz.: The North African *Ipomæa Nil*, Roth., whose seeds, in 50-grain doses, prove purgative, and in action greatly resemble Jalap; the East Indian *Ipomæa Turpethum*, R. Br., the Jamaican *I. tuberosa*, Linn., and the St. Domingo *I. cathartica*, Poir., are all used in their countries as purgatives, though the latter is generally too strong in its action to be safely given. The leaves of the Madras *Argyreia bracteata*, Wall., are used by the natives in decoction as fomentations for scrofulous enlargements. The root of the tropical *Batatas paniculata*, Chois., is cathartic; while those of the East Indian *B. edulis* are wholesome, and, as cultivated in the warmer climates, form an article of commerce known as Sweet Potatoes. Our common Bracted Bindweed (*Calystegia sepium*, R. Br.) has a purgative root, as has also the European *C. Soldanella*, Röm. & S. Oil of Rhodium, a bitter essential oil, used to attract rats and mice to traps, also to adulterate oil of roses, is distilled from the sternutatory wood of *Convolvulus* (Breweria, Rhodoriza) *scoparius*, Linn.

History and Habitat.—This too common European plant has become naturalized in the North-eastern United States, where it flowers in June. It is said to be a sure indication that the soil is dry in all localities that it chooses as its habitat.

This plant has been used much like Jalap and Scammony, in 40-grain doses of the jointed and vermiculate roots, as a diuretic and gentle laxative.

PART USED AND PREPARATION.—The whole fresh flowering plant, in a slightly wilted condition, is chopped and pounded to a pulp and weighed. Then two parts by weight of alcohol are taken, the pulp mixed thoroughly with one-sixth part of it, and the rest of the alcohol added. After having stirred the whole well, it is poured into a well-stoppered bottle, and allowed to stand eight days in a dark, cool place.

The tincture, separated from this mass by pressing and filtering, has a deep reddish-brown color by transmitted light; a somewhat nauseous odor; a slightly astringent, tea-like taste; and an acid reaction.

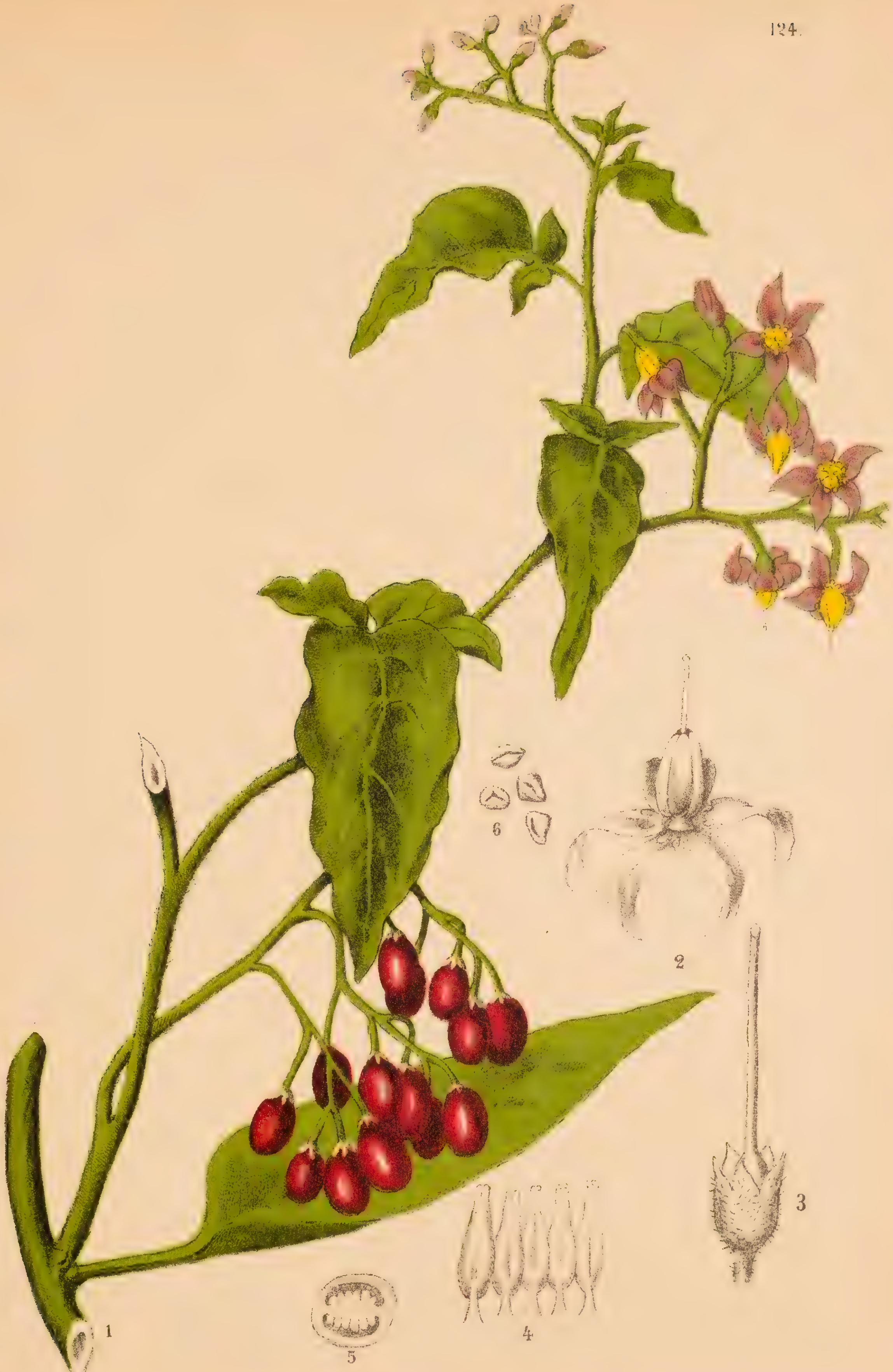
CHEMICAL CONSTITUENTS.—*Convolvulin.* This so-called resinoid, obtained from the roots of this species, is as yet of doubtful chemical nature. It remains to be determined whether it contains the principles found in Jalap, Scammony, etc.

PHYSIOLOGICAL ACTION.—The few symptoms so far determined in this drug, point to it as an irritant to the mucous membranes of the alimentary tract, and a stimulant to the neighboring secretory glands. Convolvulus causes eructations, flatulent colic, and liquid stools very similar to those following Jalap.

DESCRIPTION OF PLATE 123.

1. End of flowering plant, Salem, Mass., July 20th, 1885.
2. Anther.
3. Pistil.
4. Section of ovary.

(2–4 enlarged.)



CFm. ad nat. del. et. pinxt. **SOLANUM DULCAMARA.** Linn.

GENUS.—**SOLANUM**,* TOURN.

SEX. SYST.—PENTANDRIA MONOGYNIA.

DULCAMARA.[†]

BITTERSWEET.

SYN.—SOLANUM DULCAMARA, LINN. DULCAMARA FLEXUOSA, MOENCH. RAMUS NOVELLUS, L.

COM. NAMES.—BITTERSWEET, WOODY NIGHTSHADE, VIOLET BLOOM; (FR.) DOUCE-AMERE; (GER.) BITTERSÜSS.

A TINCTURE OF THE FRESH GREEN BRANCHES ABOVE THE WOODY STEM, OF SOLANUM DULCAMARA, LINN.

Description.—This beautiful and falsely dreaded shrubby herb, seldom reaches a length of more than 5 feet, unless well supported in a hedge or by a wall; it then may extend to various lengths, in some cases reaching 18 feet or more. *Root* woody, irregularly creeping and branching, pale yellow. *Stem* herbaceous or shrubby, flexuous, pubescent, scarcely climbing. *Branches* many, weak, flexuous and somewhat angular, with a dull green bark, destitute of thorns or spines. *Leaves* alternate, petiolate, from 2 to 3 inches long, the upper surface smooth, the under usually pubescent; the lower few leaves are either ovate or ovate-cordate, the upper vary from hastate to auriculate, all entire. *Flowers* drooping, on lateral, branching, extra-axillary peduncles, forming a loose spreading corymb with bractless pedicels. *Calyx* small, 5-parted. *Corolla* plaited, and valvate or induplicate in the bud; when expanded it is wheel-shaped, 5-cleft, with the acute-lanceolate lobes reflexed, each with two green ovate spots at its base. *Stamens* exserted, mostly equal, their filaments inserted upon the tube of the corolla. *Filaments* short, more or less triangular. *Anthers* large, erect, blunt, bright yellow, converging into a cone about the style, and opening by two pores or chinks at the apex. *Pollen* grains minute, ovoid and induplicate. *Ovary* rounded, 2-celled, containing many ovules upon the axis. *Ovules* curved (campylotropous), sometimes merging into the amphitropic form. *Style* simple, filiform, protruding beyond the tube formed by the anthers. *Stigma* single. *Fruit* a 2-celled, bright scarlet, oval, translucent, thin-skinned, bitter and juicy berry. *Seeds* numerous, whitish, somewhat plano-convex, their surfaces minutely pitted.

History and Habitat.—This very common plant prefers moist banks, old fences and hedges, the slightly higher ground on the margins of swampy spots, and disused ground about old dwellings; blossoming in June and July. Its place among American plants is doubtful; by some authors it is considered indigenous, by others as advanced from Europe; judging from its locations here, I am inclined to favor the latter idea. It is found in the greater part of Europe, in North Africa, and Asia Minor, and the northern parts of India and China. The genus Solanum is very interesting, containing as it does some of our most useful table vegetables, noxious weeds, and excellent remedies. Notably among the edible vegetables are the potato, *Solanum tuberosum*, the tomato, *Solanum lycopersicon*, and the egg plant, *Solanum melongena,* all extensively cultivated and having their origin doubtless in the tropical regions of South America. From the common names, Bittersweet and Nightshade, confusion has often arisen among the laity in mistaking it for Belladonna (Deadly Nightshade), and *Celastrus*, the staff-vine, often called Bittersweet; but Belladonna does not grow spontaneously in this country, and Celastrus is too widely different to be confused with Dulcamara except in name.

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* Derivation unknown.

[†] Dulcis, *sweet;* amarus, *bitter.*

Dulcamara is still retained in the U. S. Ph., as *Extractum Dulcamaræ Fluidum.* In the Eclectic Materia Medica its preparations are *Decoctum Solani* and *Extractum Dulcamara.*

PART USED AND PREPARATION.—The fresh, green branches that are still pliant, and their leaves, should be gathered just as the plant is budding to blossom, and chopped and pounded into a pulp, inclosed in a piece of new linen and pressed. The juice thus expressed should, by brisk succussion, be mingled with an equal part by weight of alcohol. This mixture should then be allowed to stand at least eight days in a well-stoppered bottle, in a dark, cool place, and filtered before using.

Thus prepared it is by transmitted light of a pale chestnut color, having at first a decidedly bitter, then sweet taste, and an acid reaction.

CHEMICAL CONSTITUENTS.—Solania, $C_{43}H_{71}NO_{16}$, fully described under Solanum nigrum, 125, is undoubtedly also a separate principle in this species. Wittstein claims it to be easily obtainable from the young shoots of the plant.

Dulcamarin.*—$C_{22}H_{34}O_{10}$. This glucoside, extracted from Wittstein's so-called alkaloid Dulcamarin, $C_{65}H_{160}N_2O_{29}$, is in the form of a permanent, slightly yellow powder, odorless, with at first an exceeding bitter, then a lasting sweet taste. It melts with heat, decomposing at 205° (401° F.), and is soluble in water, alcohol and ether, insoluble in chloroform and benzol. Dulcamarin readily separates in boiling with a mineral acid into dulcamaretin ($C_{16}H_{26}O$), and glucose.

Pfaff's analysis of 100 parts of the dried stems resulted as follows:

Dulcamarin,	21.817	Resin containing Benzoic Acid,	2.74
Vegeto-animal matter,	3.125	Gum, Starch, and Salts of Lime,	2.00
Gummy extractive,	12.029	Extractive and Lime Salts,	4.00
Gluten and green wax,	1.4	Woody Fibre,	62.00
(Excess,	9.111)		

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* Picroglycion, Dulcarin.

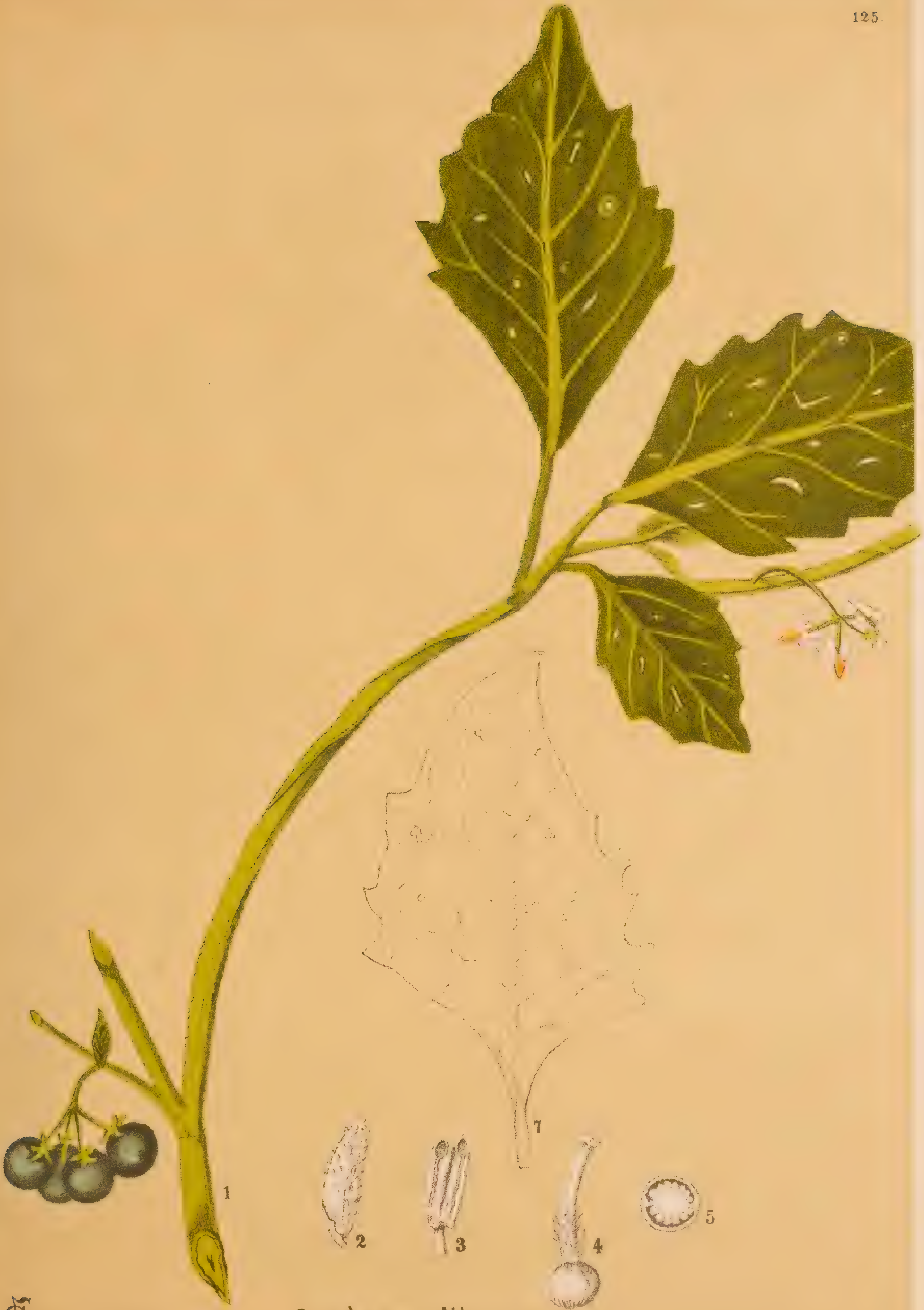
PHYSIOLOGICAL ACTION.—The first action of this drug is somewhat narcotic, but of short duration in this sphere. Upon the circulation the action is quite marked, it causing venous congestion, attended with great pain, heat, nausea and vomiting, and sudden prostration. The head droops and oscillates forth and back, the patient is giddy, the heart palpitates, the mouth and fauces become hot and dry, and the face and ears cyanotic. Post mortem: the medulla is found as to its substance healthy, though there is great injection of the blood-vessels above and below it. One clearly defined case of poisoning by the berries of this plant is reported in the *Lancet* of June 28th, 1856, p. 715, in which the identity of the plant seems to have been certain, and that the berries of Solanum nigrum, which are much more poisonous, took no part, resulted in the death of a boy aged 4. The following symptoms were noted: after eleven hours, during which no symptoms of importance were observed, he was attacked with vomiting, purging and convulsions, which continued throughout the day, the child being insensible during the intervals. He died convulsed in about 24 hours. The vomited matters were of a dark greenish color, and of a bilious character.

Notwithstanding numerous cases reported of poisoning by this plant it cannot justly be considered as generally poisonous, as most animals and persons who have eaten of it or its fruit, show no serious symptoms.

It is to be deplored that the berries were not incorporated in the tinctures proven, as they seem to be the most toxic part of the plant.

DESCRIPTION OF PLATE 124.

1. Flowering branch. Ithaca, N. Y., May 31, 1880. Fruit added later in the season.
2. Flower (enlarged).
3. Pistil (enlarged).
4. Stamens (enlarged).
5. Section of Ovary.
6. Pollen grains x 380.



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SOLÀNUM NÌGRUM, Linn.

GENUS.—**SOLANUM.**

SEX. SYST.—PENTANDRIA MONOGYNIA.

SOLANUM NIGRUM.

BLACK NIGHTSHADE.

SYN.—SOLANUM NIGRUM, LINN.; S. PTEROCAULON, DUNAL.; S. CRENATO-DENTATUM, PTYCANTHUM, AND INOPS, D. C.

COM. NAMES.—COMMON OR GARDEN NIGHTSHADE, BLACK NIGHTSHADE, DEADLY NIGHTSHADE;* (FR.) MORELLE NOIR; (GER.) SCHWARZER NACHSCHATTEN.

A TINCTURE OF THE WHOLE HERB SOLANUM NIGRUM, LINN.

Description.—This low, weedy, annual herb grows to a height of from 1 to 2 feet. *Stem* angular, glabrous, pubescent when young, diffusely spreading or branching, and more or less rough on the angles; *branches* mostly twisted. *Leaves* ovate, cuneate, somewhat obtusely, acutely, or acuminately tipped, and usually much perforated by insects; *margin* varying from coarsely, crenately, or irregularly toothed, to entire. *Inflorescence* in small, pedunculate, lateral, and extra-axillary, umbel-like, drooping cymes; *flowers* quite small, white or whitish. *Calyx* much shorter than the corolla, merely spreading in fruit; *teeth* ovate, acutish. *Corolla* wheel-shaped, 5-parted, valvate in the bud; *petals* oblong-lanceolate, reflexed, closely studded with minute papillæ upon the upper surface. *Stamens* exserted; *filaments* very short, more or less hairy inside; *anthers* large, connivent around the style, blunt, opening by two terminal pores. *Ovary* globular, 2-celled; *style* columnar, mostly included, hairy at its base; *stigma* capitate. *Fruit* a small cluster of blue-black, globular berries, each about the size of a large pea. *Seeds* numerous, flattened; *embryo* slender, curved; *cotyledons* semiterete, not larger than the radicle.

Solanaceæ.—This large, well-known order, whose representatives grow mostly in tropical and subtropical regions, furnishes North American botany with 14 genera, 101 species, and 24 recognized varieties. The order is characterized as follows: Herbs, shrubs, or even trees, commonly rank-scented, and having a watery juice. *Leaves* alternate, never truly opposite, though, being often unequally geminate they have the appearance of being opposite; *stipules* none. *Inflorescence* properly terminal and cymose, but variously modified, sometimes scorpioid-racemiform; *pedicels* not bracted, or, if bracted, then not in the axils. *Flowers* perfect and mostly regular, 5- 4-merous. *Corolla* with its lobes induplicate-valvate, plicate, or very rarely imbricate in the bud. *Ovary* wholly free, normally 2-celled; *placentæ* axillary; *ovules* indefinitely many, anatropous or amphitropous; *style* undivided; *stigma* entire or sometimes bilamellar. *Fruit* either capsular or baccate; *embryo* terete and incurved or coiled, or sometimes almost straight; *albumen* fleshy; *cotyledons* rarely much broader than the radicle.*

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* Belladonna alone answers to this name: it does not grow wild in this country.

This order furnishes our Materia Medica with twenty drugs, which are, beside the five here described: The European Belladonna, or Deadly Nightshade (*Atropa Belladonna*, Linn.); the Tropical Cayenne Pepper (*Capsicum Annuum*, Linn.); the Pacific coast Tree Stramonium (*Datura arborea*, Linn.); the Chinese Datura (*D. ferox*, Linn.), probably the most poisonous species in the family; the Indian Datura (*D. metel*, Linn.); the Tropical American Tomato, or Love-apple (*Lycopersicum esculentum*, Mill.); the true Mandrake of Southern Europe (*Atropa mandragora*, Linn.); the South Brazilian *Arrebenta Cavallos* (*Solanum Rebenta*, Vell.); the Southern and West Indian Apple of Sodom, or Nipple Nightshade (*S. mammosum*, Linn.); the Brazilian *Juquerioba*, or *Gyquirioba* (*S. oleraceum*, Vell.); the European Jerusalem Cherry (*S. pseudo-capsicum*, Linn.); the common Potato (*S. tuberosum*, Linn.) and its diseased state (*S. tuberosum ægrotans*), due to the growth of a fungus known as *Peronospora infestans;* the Peruvian *Floripondio* (*Datura sanguinea*, R. et Pav.); the Australian Corkwood Tree (*Duboisia myoporoides*, R. Br.), and Pituri (*D. Hopwoodi*, Von M.).

Numerous drugs, still unproven but used in general practice, belong to this order, notably, the Indian Guinea Pepper (*Capsicum fastigiatum*, Blume), which, with the Indian Goat Pepper (*C. frutescens*, Linn.), is a much more powerful stimulant than Cayenne, and often produces violent pain and purgation. The genus *Solanum* further furnishes to medicine the Indian expectorant, *S. Jacquiri*, Willd.; the West Indian astringent, *S. Bahamense*, Linn.; the Brazilian active cathartic and vulnerary, *Juripeba* (*S. paniculatum*, Linn.); the South American sudorific, *S. cernuum*, Vell.; and many other species used in their native countries as purgatives, diuretics, deobstruents, and vulneraries. The fruit of the West Indian Calabash Tree (*Crescentia Cujete*, Linn.) yields a pulp that is considered at once vulnerary and pectoral. In the south of Europe the White Henbane (*Helleborus albus*, Linn.) is considered much more active than *H. niger;* and Arabia yields, according to Foreskäl, a species, *H. Datura*, used by the natives to produce intoxication, and supposed to be the *nepenthes* of Homer. The genus *Cestrum* contains many active species, those especially notable being, the South African *C. venenatum*, Thursb., used by the Hottentots as a poison for their spears, and to poison their bait for wild beasts; *C. macrophyllum*, Vent., and *C. nocturnum*, Lam., are also toxic, and have been used with some effect in chorea; while *C. Hediunda*, Lam., and *C. auriculatum*, L. Her., are febrifugal. Many species of *Physalis* are valuable, especially the South European *P. flexuosus*, Linn., which is said to be narcotic, diuretic, and alexiteric; and the Winter Cherry, *P. Alkekengi*, Linn., which has been considered an excellent diuretic from the days of Dioscorides; Ray considered it also anti-podagric. The bitter leaves of the Peruvian *Saracha umbellata*, Jacq., are used as an anodyne emollient. In New Grenada the Matrimony Vine (*Lycium umbrosum*) is adjudged an excellent remedy in erysipelas; and, lastly, the South American *Himeranthus uncinatus* is esteemed by the natives as an aphrodisiac, stimulating the ingester to venery.

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* Description of Prof. Asa Gray, in *Synop. Flora of N. A.*, vol. ii, pt. i, p. 224.

History and Habitat.—Black Nightshade is a cosmopolite; in this country it grows in damp and shady waste grounds, generally throughout the eastern section, where it flowers from July to frosty weather.

This species has been used in general practice, especially as a resolvent, from A. D. 54 (Dioscorides) to within a few years. The principal use of the plant has been in dropsy; gastritis; glandular enlargement; nervous affections; general inflammations of mucous membranes; herpetic, scorbutic, and syphilitic eruptions; and as a narcotic. The Arabs use the bruised leaves, with adeps, as an application to burns, bullæ, and felons. In Dalmatia the root is used to cure hydrophobia, and is fried in butter and eaten to produce sleep; while in Bohemia the blossoming plant is hung over the cradle of infants to act as an hypnotic. Orfila claims the extract equal in power and energy to lactucarium. In Spain patients are often said to be cured of phthisis by burying them up to the neck in garden loam, then, after removal, rubbing the body thoroughly with an ointment of the leaves of this species.

PART USED AND PREPARATION.—The whole plant, gathered when, in early autumn, it is in both flower and fruit, is treated as in the preceding species.

The resulting tincture has a brownish-orange color by transmitted light, no distinguishing odor, a slightly astringent and woody taste, and an acid reaction.

CHEMICAL CONSTITUENTS.—*Solania*,* $C_{43}H_{71}NO_{16}$. This peculiar body, having, according to all observers up to date, both alkaloidal and glucosidal reactions, needs much careful investigation before either its chemical or physical nature can be fully understood. It is readily obtainable from all species of the genus Solanum, but is especially prevalent in this. According to Wittstein, it crystallizes in white, flat, quadrangular prisms of mother-of-pearl lustre, or results as an amorphous powder of like appearance; it is inodorous, and has a bitter, disagreeable, long-lasting, rancid, and acrid taste. It is soluble to only a slight extent in water, its solution becoming frothy on agitation; readily dissolves in alcohol; and is insoluble in ether. It shows a decided glucosidal nature by breaking down under the action of heat and hydrochloric acid, as follows:

$$\underset{\text{Solanin.}}{C_{43}H_{71}NO_{16}} + \underset{\text{Water.}}{(H_2O)_3} = \underset{\text{Glucose.}}{(C_6H_{12}O_6)_3} + \underset{\text{Solanidine.†}}{C_{25}H_{41}NO.}$$

PHYSIOLOGICAL ACTION.—Numerous cases of poisoning have been reported, among which the following will serve to show the action of the plant:

Three children who had eaten the berries complained of headache, vertigo, nausea, colic, and tenesmus. There was copious vomiting of a greenish-colored matter, thirst, dilated pupils, stertorous respiration, convulsions, and a tetanic stiffness of the limbs. Death followed in all cases but one only during the acute symptoms.*

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* Discovered in the plant in 1821 by M. Desfosses, *Jour. de Pharmacie*, vi, 374, and vii, 414.

† This body is a very strong base, and crystallizes in long needles (Schorlemmer).

A boy, after eating the berries, suffered horrible symptoms, dilation of the pupil, burning in the stomach, delirium, agony, trembling of the limbs, cold sweat, and death.†

Gataker‡ commenced his experiments with the drug by giving a grain, which acted gently as an evacuant by sweat, urine, and stool; on increasing the dose until it was quite large, it produced vomiting, profuse perspiration, or too copious urination or diarrhœa, and sometimes dimness of vision and vertigo.

A family, having eaten of the leaves, were attacked with swelling of the face, accompanied by burning heat, and followed by gangrene.§

A boy, aged eight years, ate some of the black berries of this plant, which induced a state of stupor and coma, attended with fever. He complained of great pain in the pit of the stomach, and was harassed with nausea and retchings.||

A little girl ate some of the berries. She was found entirely insensible, lying in a deep, *apoplectic stupor*, all the muscles relaxed, the face flushed and the pulse full and irregular. She continued in this state about six hours, then gradually recovered.¶

Four of the ripe berries caused deep sleep in a child (age not given).**

Two boys, aged two and three years, having eaten of the berries, had convulsions and spasms; they stretched their hands during the spasms, as if they would grasp something, carrying their hands to their mouths, chewing and swallowing, etc.††

Thus Solanum Nigrum acts as an irritant to the brain and spinal cord, and secondarily upon the circulation through the vaso-motor system; the irritation seems greatest upon the sensory nerves and less upon the motor. Its action upon the brain is quite parallel with that of Belladonna, but evidently greater than Stramonium or Hyoscyamus. Its action upon the eye is more like that of Stramonium than Belladonna, and directly opposite to that of Gelsemium.

DESCRIPTION OF PLATE 125.

1. Part of a fruiting and flowering branch, Binghamton, N. Y., Sept. 1st, 1885.
2. A petal.
3. An effete stamen.
4. Pistil.
5. Horizontal section of the ovary.

(2–5 enlarged.)

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* Orfila. *Taylor on Poisons*, p. 648.

† K. Ch. Grelin. *Florce bedensic*, p. 520.

‡ *Versuch. u. Bemerk. des Edin.*, pp. 95 and 98.

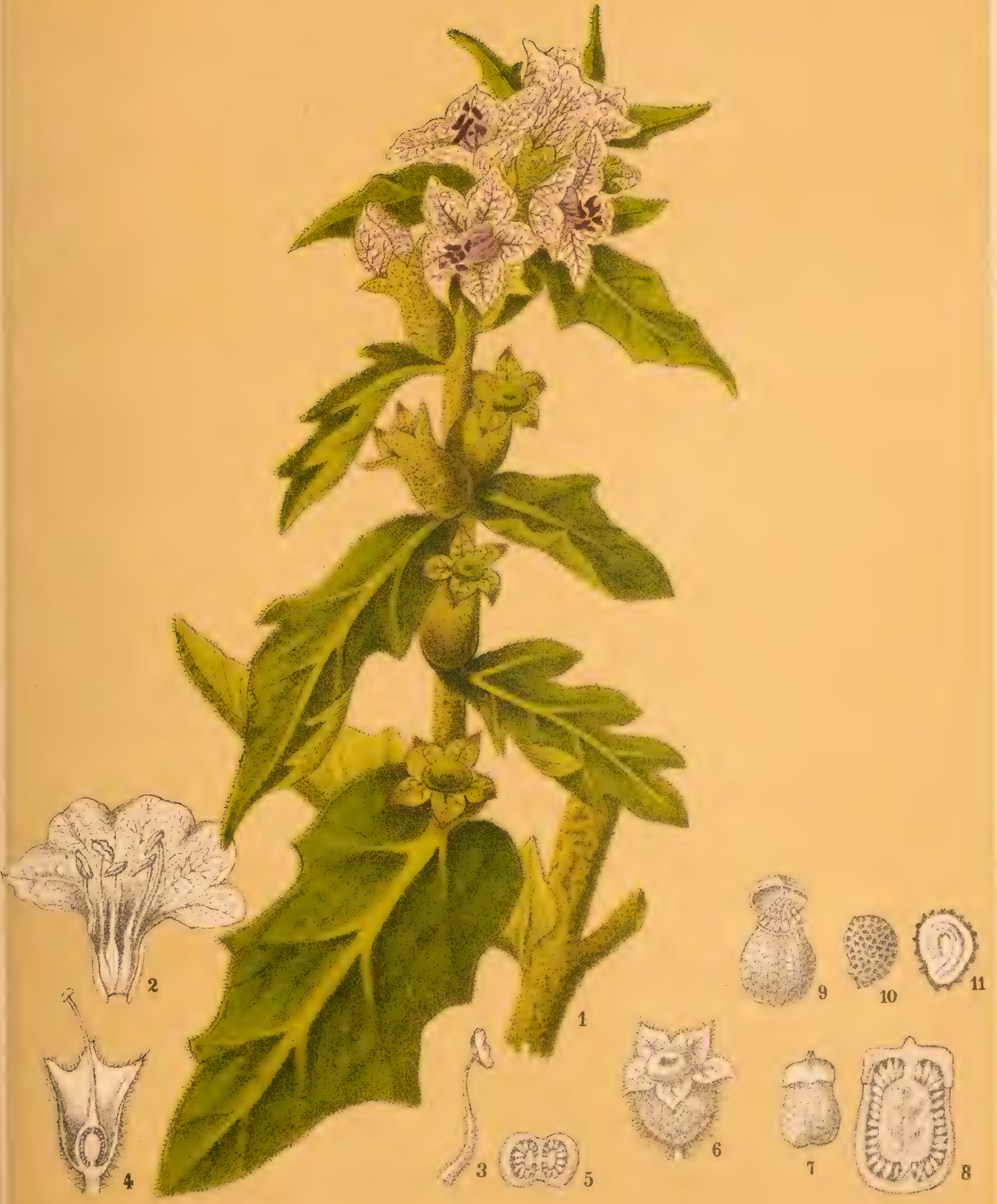
§ Rucker, *De effect, Solani in Commerc, Morci.*, p. 372.

|| *Alibert, Nouveaux Élèments de Thèrapeutique.*

¶ *Eberle, Therapeutics.*

** *Ibid.*

†† *Journal de Clinic Medical.*



C.F.M. ad nat del. et pinxt.

HYOSCỲAMUS NÌGER, Linn.

GENUS.—**HYOSCYAMUS**,* TOURN.

SEX. SYST.—PENTANDRIA MONOGYNIA.

HYOSCYAMUS.

HENBANE.

SYN.—HYOSCYAMUS NIGER, LINN.; H. FLAVUS, FUCHS.; H. PALLIDUS, KIT.; H. VULGARIS, RAII.; H. LETHALIS, SALISB.; H. AGROSTIS.

COM. NAMES.—BLACK HENBANE, HOGBEAN, STINKING NIGHTSHADE, POISON TOBACCO; (FR.) JUSQUIAME NOIR; (GER.) BILSENKRAUT.

A TINCTURE OF THE WHOLE HERB HYOSCYAMUS NIGER, LINN.

Description.—This annual, or biennial, heavy-scented, viscid-pubescent, or villous herb, usually attains a growth of from 1 to 2 feet. *Root* fusiform; *stem* rigid. *Leaves* oblong, acute, the lower large, spreading upon the ground, sinuate-toothed and angled, the upper more or less amplexicaul and partly decurrent, the uppermost tending to be entire and bract-like, subtending the flowers. *Inflorescence* in secund, scorpioid, leafy spikes; *flowers* numerous, sessile. *Calyx* large, tubular-campanulate or urceolate; *border* 5-cleft, spreading; *teeth* equal, broadly triangular, acute. *Corolla* oblique, funnel-form, dull yellowish, strongly reticulated with anastomosing purple veins; *limb* spreading, inclined to be unequally 5-lobed and plaited; *lobes* shallow, rounded, and more or less acute. *Stamens* 5, declined, all perfect, and slightly exserted; *filaments* inserted upon the corolla-tube near its base and continuing attached for about half their length, where they are also hairy; *anthers* purple, turned upon their backs, and opening by a longitudinal chink. *Style* filiform; *stigma* dilated-capitate. *Capsule* membranaceous, 2-celled, enclosed by the persistent calyx, which is now many-costate and reticulate-veiny; *dehiscence* by an apical circumscissile line, the top falling away like a lid. *Seeds* very numerous, roundish-oval, slightly hollowed upon each side; *testa* conspicuously reticulated; *embryo* much curved, axile; *albumen* copious.

History and Habitat.—Henbane is indigenous to Europe and Western Asia, from whence it was introduced into this country by the English settlers, in the seventeenth century. It grows, with us, near dwellings and settlements, from Nova Scotia and Canada, southward to the environs of New York City and Brooklyn, where it blossoms from June to August. The seeds are notably tenacious of life; hence the plant is often found in localities after having disappeared years before.†

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* Ὓς, ὑός, *Hus*, *hyos*, a hog; κυαμος, *kyamos*, a bean; because it does or does not poison swine—an open question.

† Dr. Bigelow says: "About ten years since (1807), a drain, which intersects the Common in Boston, was opened for the purpose of repairs. In the following season a distinct row of very luxuriant plants of Henbane covered the whole of this drain, although none of them had been observed to grow in the vicinity the preceding year. The seeds which produced these plants had probably been buried for more than fifteen years."—*Am. Med. Bot.*, 1, 161.

Hyoscyamus—principally *H. albus*, Linn.—was medicinal among the ancients, and the *Ὑοσκύαμος μελας* of Dioscorides, who rejected *H. niger* as being too highly poisonous for use. The white species is also, according to Sprengel, described by Hippocrates. Pliny speaks of Henbane, as follows:* "Moreover, unto Hercules is ascribed Henbane, which the Latins call Appollinaris; the Arabians, Altercum or Altercangenon; but the Greeks, Hyoscyamus. Many kinds there be of it, the one beareth black seed, flowers standing much upon purple, and this herbe is full of prickes; and in very truth such is the Henbane that groweth in Galatia. The common Henbane is whiter, and brauncheth more than the other, taller also than the poppie. * * * All the sort of these alreadie named trouble the braine, and put men besides their right wits; besides that, they breed dizziness of the head. As touching the fourth, it carieth leaves soft, full of down, fuller and fatter than the rest: the seed also is white, and it groweth by the seaside. Physicians are not afraid to use this in their compositions, no more than that which has red seed. Howbeit, otherwiles, this white kind especially, if it bee not thoroughly ripe, prooveth to be reddish, and then it is rejected by the physicians. For, otherwise, none of them all would be gathered, but when they bee fully drie. Henbane is of the nature of wine, and therefore offensive to the understanding, and troubleth the head. Howbeit, good use there is, both of the seed it selfe as it is in substance, and also of the oile or juice drawne out of it apart. And yet the stalk, leaves, and roots are employed in some purposes. For mine owne part, I hold it to be a dangerous medicine, and not to be used but with great heed and discretion. For this is certainly knowne, that, if one take in drinke more than four leaves thereof, it will put him beside himself. An oile (I say) is made of the seed thereof, which, if it be but dropped into the eares, is ynough to trouble the braine. But, strange it is of this oile, that, if it be taken in drinke, it serveth as a counter poison. See how industrious men have been to prove experiments, and made no end of trying all things, insomuch as they have found meanes, and forced very poysons to be remedies." The Arabian physicians also rejected *H. niger* as a medicinal drug; but in later years it gradually took the place of the white.

In Europe, the history of Henbane is remote. It is spoken of by Benedictus Crispus (A. D. 681); Macer. Floridus (10th Cent.); in Anglo-Saxon works (11th Cent.); "Physicians of Myddvai (13th Cent.); and *Arbolayre*, a French herbal (15th Cent.); from which time it fell into disuse, until brought again to the notice of physicians, in 1762, by Baron Störck.†

Hyoscyamus is now quite generally used by physicians of all schools, prescribing in the so-called physiological manner, as a sedative in various affections, such as epilepsy, hysteria, mania, febris nervosa, angina pectoris, etc.; as an anodyne in rheumatism, arthritis, podagra, neuralgia, gastralgia, colica pictorum, cephalalgia, etc.; as an anti-spasmodic in asthma, croup, pertussis, phthisical coughs, and irritable conditions of such organs as are mostly supplied with involuntary muscular fibres, as the diaphragm, heart, lungs, uterus, bladder, and urethra; and as an hypnotic in all cases where opium would be used, did it not disagree. It is also claimed, in this connection, that Hyoscyamus rather tends to keep the bowels open, than to constipate like opium. Hyoscyamus leaves are often used as fomentations or cataplasms for painful swellings, such as irritable ulcers, indurated glands, and tumors, as well as in severe chordee, orchitis, etc. The doses given, are: 10 grains of the powdered leaves; 5 to 10 grains of the extract; one-half to 1 drachm of the tincture; or very small doses of Hyoscyamine.

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* *Holland's Trans.*, 1601, 215. (Hamilton.)

† Flückiger and Hanbury, *Pharmacographia*, 463.

The laity have often used the smoke of the smouldering leaves in odontalgia, by directing it into the caries by means of a paper funnel; but as convulsions, delirium, and other frightening symptoms have followed in some cases, this practice is now seldom resorted to.

The following preparations and *Hyoscyami Folia*, are officinal in the U. S. Ph.: *Abstractum Hyoscyami; Extracta Hyoscyami Alcoholicum* and *Fluidum*, and *Tinctura Hyoscyami*. *Hyoscyaminæ Sulphas* is also recommended. In the Eclectic Dispensatory, a tincture and the two extracts are mentioned.

PART USED AND PREPARATION.—The fresh herb, gathered just before flowering, or after the seed pods are well formed and the summit of the plant is still flowering, is treated in the manner laid down for Dulcamara.* The resulting tincture has a clear brownish-orange color by transmitted light; the strong, heavy odor of the plant; an unpleasant, slightly bitter taste; and an acid reaction.

CHEMICAL CONSTITUENTS.—*Hyoscyamine*,† $C_{15}H_{23}NO_3$.‡ This noted, mydriatic, highly poisonous alkaloid, was first detected by Brandes; Geiger and Hesse procured it in an impure state from the herb in 1833, but it was not isolated in a pure state until 1871, when Höhn extracted it from the seeds, which are richer in this principle than the herb. It is described as an oily liquid, concreting later into verrucose-tufted crystals, which Duquesnel has succeeded in crystallizing into stellately grouped, acicular prisms. The crystals fuse at 90° (194° F.), and are soluble in ether, chloroform, alcohol, and water. Hyoscyamine is decomposed by caustic alkalies; and in aqueous solution, when boiled with Baryta, it splits into the two following bodies:

Hyoscine, $C_6H_{13}N$.—This volatile, oily liquid, of an alkaline reaction, having a narcotic odor, is now claimed, by Ladenburg, to be identical with *Tropine* (Belladonna); and that *Hyoscine* proper is a second alkaloid of Hyoscyamus, yielding different salts than either *Hyoscyamine* or *Tropine;* and

Hyoscinic Acid, $C_9H_{10}O_3$.—This crystalline body, melting at 105° (221° F.), is isomeric with *Tropic Acid* (Belladonna) and may yet be found to be identical with it.

Oil of Hyoscyamus.—This thin, inodorous, greenish-yellow liquor, is obtainable from the seeds by pressure. It has a sp. gr. of 0.913, and is soluble in 60 parts of alcohol.

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* Page 124-2.

† Hyoscyamia, Duboisin.

‡ Höhn and Reichardt; other authorities, $C_{17}H_{23}NO_3$.

Potassium Nitrate, KNO_3.—Crystals of this salt were isolated from this plant by Attfield.*

PHYSIOLOGICAL ACTION. — All parts of this plant are poisonous; the seeds, however, are the most active, the root next, and, lastly, the leaves and flowers. The effluvium arising from the cut and bruised leaves has been known to cause of itself, vertigo, stupor, and syncope.

On Animals.—Orfila states that the drug acts upon dogs much the same as upon man, producing dilation of the pupils, weakness of the posterior extremities, staggering, and insensibility. Moirond states that, given in large quantities to horses, it causes slight dilation of the pupils, spasmodic movements of the limbs, and increased heart's action. On cats it acts much the same as upon dogs. Upon gallinaceous birds it is supposed to have a baneful action; while cows, sheep, goats, rabbits, and many other animals are said to be but slightly affected.

On Man.—The action of Hyoscyamus upon man, is that of a powerful narcotic poison, a severe, cardiac, and cerebral stimulant, and tends to produce general paralysis of the nervous system. Of the delirium produced, Dr. Harley remarks —as Dioscorides had before him—that it greatly resembles that produced by alcoholic intoxication.

The symptoms in general, resulting from taking the drug, are: Lively, wild, or busy delirium, tending more to the grotesque than to the harmful type; the patient laughs, talks, gesticulates, dances, etc., and carphologia is often noticed; vertigo and confusion; eyes red, wild, and sparkling, with dilation of the pupils; insensibility of the retina, and illusions of sight; redness of the face; dryness of the mucous membranes of the mouth and fauces; paralysis of the tongue; difficult deglutition; nausea and vomiting; tympanitic distention of the abdomen; diarrhœa, and involuntary passages; paralysis of the bladder, and retention of urine; dry cough; rapid, irregular heart's action; trembling of the upper limbs, weakness of the legs; convulsions; insomnia; chill, fever, and sweat.

The following cases of poisoning by this drug, will serve to show its method of action: Nine persons, having eaten the roots of Hyoscyamus, were seized with alarming symptoms: "Some were speechless, and showed no other signs of life than by convulsions, contortions of their limbs, and the *risus sardonicus;* all having their eyes starting out of their heads, and their mouths drawn backwards on both sides; others had all the symptoms alike; however, five of them did open their mouths, now and then, but it was to utter howlings. The madness of all of these patients was so complete, and their agitations so violent, that, in order to give one of them an antidote, I was obliged to employ six strong men to hold him while I was getting his teeth asunder, to pour down the remedy. Upon their recovery, all objects appeared to them as scarlet, for two or three days."—(Dr. Patouillat, *Phil. Trans.*, 40, 446.)

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* *Pharm. Jour.*, 1862, 447. For authorities upon the Chemistry of Hyoscyamus, and further study, see Bibliographical Index, in the Appendix.

Seven persons ate broth, in which the leaves of Hyoscyamus had been boiled; symptoms of intoxication soon followed: "I saw them about three hours after having eat it; and then three of the men were become quite insensible, did not know their comrades, talked incoherently, and were in as high a delirium as people in the rage of a fever; all of them had low, irregular pulses, slavered, and frequently changed color; their eyes looked fiery, and they catched at whatever lay next them, calling out that it was going to fall."—(Dr. Stedman, *Phil. Trans.*, 1750.)

Wepfer relates that several monks made a repast on the roots of wild endive (Cichorium Intibus), among which were mixed, by mistake, two roots of Henbane. In a few hours some experienced vertigo, others a burning of the tongue, lips, and throat; severe pains were also felt in the iliac regions, and in all the joints. The intellectual faculties and the organs of vision were perverted, and they gave themselves up to actions which were mad and ridiculous. In other cases, a haggard countenance, dilation of the pupils, difficulty of breathing, small and intermittent pulse, loss of speech, trismus, and temporary loss of intellect have been the principal symptoms; while the extremities have been observed to be cold and nearly paralyzed.—(Orfila 2, 135.)

A woman, æt. 34, swallowed, in mistake for a black draught, an ounce and a half of the *tincture* of Hyoscyamus, made apparently from the biennial plant, and resembling the pharmacopœial tincture. (The annual plant is said to make a weaker tincture.) In *ten minutes* she had a hot, burning, pricking sensation in the hands, feet, and legs; became giddy and delirious, and complained of great dryness in the throat. Shortly after, in attempting to get out of bed, she found her legs were powerless. A purplish rash appeared over the body, particularly about the neck and face, which were much swollen. The draught was taken at 5 A. M. At 9 A. M. Dr. White found her almost insensible and unable to speak. The tongue was swollen, brown, and dry, and put out with difficulty; the face swollen and scarlet; the pupils were so dilated that the iris was a mere thread-like ring; the skin hot and dry. The poison had been taken on an empty stomach. There was no sickness. In three hours she passed a motion smelling strongly of this drug, but the odor was not perceived in the urine. She could not see distinctly. All motion in the extremities was lost, and their sensibility was diminished. At 4 P. M. she was delirious, and there was a sickness; 11 P. M., shivering and coldness of the skin. At 9 A. M. the next day she could see and articulate better. The iris was half a line in breadth. Brandy, opium, ammonia, and other remedies were used, and she gradually improved. It was six days before she acquired a partial use of her legs, and could not then stand without being supported on both sides. She had quite lost her memory, and talked in a rambling manner. She was unable to remember for a minute a single sentence or word she had uttered or read.—(Dr. White, *Lancet*, July 5, 1873, p. 8.)

Two men ate the young shoots of the plant. The first effect was that the earth seemed to pass suddenly from under them; the tongue became paralyzed, and their limbs were cold, torpid, paralyzed, and insensible; the arms were in a state of spasmodic action; the pupils were dilated, the look was fixed and vacant;

breathing difficult; the pulse small and intermittent. Beside these symptoms, there was the spasmodic grin (*risus sardonicus*), with delirium; and the jaws were spasmodically closed. Under treatment the men recovered in the course of two days.—(Orfila, 4ème ed., vol. 2, p. 264.)

A woman collected in a field a quantity of the roots by mistake for parsnips. They were boiled in soup, of which nine persons in the family partook without remarking any particular taste. Very shortly afterward the whole of these persons felt uneasy, and complained of a bitter, acrid taste in the mouth, with nausea. The pupils of the eyes were dilated, and there was indistinctness of vision. These symptoms were followed by great restlessness, convulsions, and continued delirium. The patients successively lost the power of vision, hearing, and voice, and were affected with stupor and insurmountable somnolency.—(*Ed. Med. and S. J.*, Oct., 1844, p. 562.)

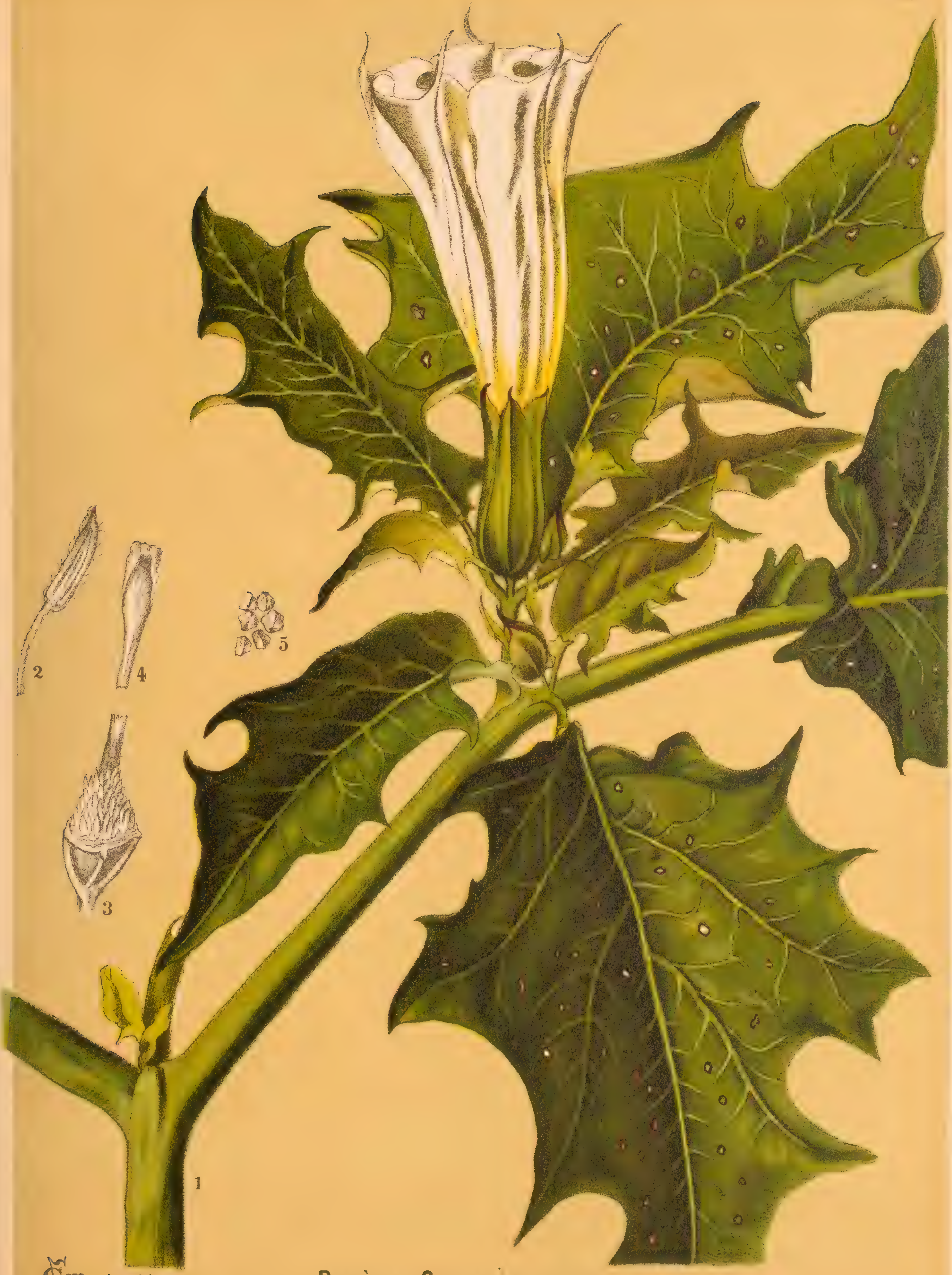
Post-Mortem.—Orfila quotes a case of fatal poisoning by the roots, and Wibmer one by the leaves. The appearances were those of general congestion of dark-colored liquid blood in the venous system, such condition being found in the lungs and brain. There are commonly found no traces of irritation or inflammation in the stomach or bowels.

"The differential diagnosis of the three mydriatics in the treatment of head affections is fairly stated by Dr. Phillips. In cases of cerebral hyperæmia, the severer forms are removed by Belladonna, while Hyoscyamus proves its value when there is little or no congestion, but much excitement. So in the case of delirium; the forms of this disorder, for which Hyoscyamus is adapted, are the milder and less inflammatory ones, whereas the severer cases are better dealt with by Belladonna and Stramonium. Hyoscyamus is specially useful again in those cases of delirium with hallucinations which are accompanied with little or no cerebral congestion, but where there is great excitability of the nervous system, and where there is reason to fear that the operation of opium would prove injurious."—(Hughes, *Pharmacodynamics*, p. 414.)

DESCRIPTION OF PLATE 126.

1. A flowering and fruiting branch, from near Boston, July 27th, 1884.
2. Opened corolla.
3. Stamen.
4. Opened calyx, showing pistil.
5. Horizontal section of the ovary.
6. Fruiting calyx.
7. Fruit.
8. Longitudinal section of fruit.
9. Dehiscent fruit.
10. Seed. } × 50 diameters.
11. Longitudinal section of seed } × 50 diameters.

(2–9 enlarged.)



CF.M. ad nat del. et pinxt.

DATÙRA STRAMONIUM, Linn.

N. ORD.—SOLANACEÆ.

Tribe.—HYOSCYAMEÆ.

GENUS.—**DATURA**,[*] LINN.

SEX. SYST.—PENTANDRIA MONOGYNIA.

STRAMONIUM.[†]

THORN-APPLE.

SYN.—DATURA STRAMONIUM, LINN.; STRAMONIUM SPINOSUM, GER.; S. FŒTIDUM, SCOP.; S. VULGATUM, GAERT.

COM. NAMES.—THORN-APPLE, DEVIL'S APPLE, MAD APPLE, APPLE OF PERU, JAMESTOWN OR JIMSON WEED, STINK-WEED; (FR.) POMME ÉPINEUSE OU L'ENDORMIE; (GER.) STECKAPFEL.

A TINCTURE OF THE FRESH RIPE SEED OF DATURA STRAMONIUM, L.

Description.—This rank, glabrous, annual, bushy berb, grows to a height of from 2 to 4 feet. *Root* tapering, somewhat branched. *Stem* very smooth, subcylindrical, green and succulent, at first bifurcating, then dichotomously branching. *Leaves* alternate, and at times opposite, upon the same plant, in reality more or less scattered; all more or less cordate at the base, but in many instances unequal, in this case one side of the base is prolonged decurrently along the upper side of the petiole. In outline the leaves are ovate, very irregularly sinuate, and laciniately toothed or angled; they are smooth, deep green above, pale beneath, and all the older ones are plentifully perforated by the ravages of worms. *Inflorescence* solitary in the forks of the branches; *flowers* erect, 2 to 4 inches long, raised upon a short rigid peduncle. *Calyx* tubular, prismatic, half-persistent, circumscissile, *i. e.*, separating transversely above the base, the upper portion falling away, the lower remaining persistent and forming in fruit a peltate border to the under side of the capsule; *limb* 5-toothed. *Corolla* infundibuliform, delicate, creamy white, convolute-plicate in æstivation; *limb* plaited, larger and spreading, 5-toothed; *sinuses* long subulate-pointed. *Stamens* 5, included; *filaments* long and filiform, inserted upon the tube of the corolla; *anthers* adnate, oblong and pointed. *Style* slender, longer than the stamens, but not exserted; *stigma* clavate, 2-lipped. *Fruit* an erect, globose-ovoid and more or less quadrilateral, divergently echinate, 2-celled pod; *pericarp* coriaceous; *valves* 4; *placentæ* 2, thick, projected from the axis into the middle of each cell, where each division becomes somewhat expanded into two placentiferous lines at the middle, thus rendering the pod in reality 4-celled, except at its apex. *Seeds* very numerous, rather large, laterally flattened horizontally, and somewhat reniform; *testa* crustaceous, scrobiculate-rugose; *embryo* much curved.

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[*] The Arabic name *Tatorah* (Indian *Daturo*), given to *D. fastuosa*, Linn.

[†] Στρυχνομανικον, *strychnomanikon*, referring to its causing madness.

History and Habitat.—Stramonium is judged by De Candolle to be indigenous to the Old World, probably to the borders of the Caspian Sea and the adjacent regions. It is one of the many Solanaceous plants whose origin is exceedingly doubtful. This species is now only found near the habitations of man, and then generally in garbage heaps where the soil is loose but rich, being in reality a true weed of civilization, scattered throughout almost all of the temperate and warmer regions of the globe. It was at one time seriously maintained that America was its birthplace, but in no locality here does it at all approach a situation that has the semblance of a natural site; so thoroughly does it cling to waste heaps that the American Aborigines named it *The White Man's Plant* in allusion to its only place of growth, *i. e.*, near the homes of the civilized. With us in the North, it blossoms from July to October, and ripens its capsules from September to November.

The first notice of Stramonium is, in all probability, that of Fuchsius (1542), who states that it was introduced into Germany from Italy.* Gerarde (who received some of the seeds from Lord Zouch, who sent them from Constantinople, about the end of the 16th century), cultivated the plant in England.

Baron Störck was first to introduce the plant into medicine, to any extent. He used it internally in mania and epilepsy. "If," he says, "Stramonium produces symptoms of madness in a healthy person, would it not be desirable to make experiments in order to discover whether this plant, by its effects on the brain in changing the ideas and the state of the sensorium (*i. e.*, of the part, whatever it may be, which is the centre of action of the nerves upon the body)—should we not, I say, try whether this plant would not restore to a healthy state those who are suffering from alienation of mind? and if by the change which Stramonium would cause in those who suffer from convulsions, by putting them into a contrary state to that in which they were, would it not cause their cure?" Bergius states † that he frequently saw maniacs restored to saneness of mind, which they never afterward lost, by the continued use of the extract of Stramonium; and that by the same means he effectually cured the delirium so often attendant upon child-birth.

In general practice Stramonium has been used as a narcotic, soothing drug, in chorea (Wedenberg); epilepsy (Odhelius); neuralgia; and tic-douloureux; and as an ointment, for the same purpose, in recent burns and scalds, nymphomania and rheumatism. One of its principal uses, however, has been that of the dried leaves, smoked as cigarettes, during the spasm of asthma, a practice highly recommended by Dr. Bigelow.

The officinal parts of this plant in the U. S. Ph., are: *Stramonii Folia* and *Stramonii Semen;* of the latter the preparations are: *Extractum Stramonii; Extractum Stramonii Fluidum*, and *Tinctura Stramonii*. In the Eclectic Materia Medica the following preparations are recommended: *Cataplasma Stramonii; Extractum Stramonii Alcoholicum; Tinctura Stramonii; Unguentum Stramonii*. The drug also plays a part in their *Tinctura Viburnii Composita* and *Unguentum Stramonii Compositum*.‡

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* Sprengel, *Hist. Rei. Herb.*, ii, 326.

† *Bull. des Plantes Vên. et Susp. de Fr.*, i, 38; and *Mat. Med.*, l. c.

‡ Dulcamara, Stramonium, Cicuta, Belladonna, Rumex, and Oleum Terebinthinæ.

PART USED AND PREPARATION.—The ripe seeds are powdered and covered in a well-stoppered bottle, with five parts by weight of alcohol, and allowed to stand for eight days in a dark, cool place; vigorously shaking the vial twice a day.

The tincture separated from this mass by filtration is clear, and has a beautiful brownish-orange color by transmitted light. The slight odor it exhales is not characteristic; it has no peculiar taste, but leaves a numb feeling upon the tongue very similar to that caused by carbolic acid. Its reaction is acid.

Should the bottle be left longer before filtration, the tincture will become stronger each day until it is opaque. Then in thin layers it exhibits a beautiful orange-red color by transmitted light, and when looked down upon presents a brilliant iridescent, grass-green film, which does not change during agitation, although it appears like a stratum separable from the rest of the preparation. This last preparation is, of course, unofficinal, but is mentioned simply to show that our tincture does not represent the full strength of the seed.

CHEMICAL CONSTITUENTS.—*Datura-Atropine* or *Daturine.*—This body was discovered in Stramonium by Geiger and Hesse in 1833. A. von Planta in 1850 proved it identical with *Atropine,*[*] not only in solubility and fusibility, but also in its chemical composition ($C_{17}H_{23}NO_3$), and many physical properties. It differs, however, sufficiently to suggest to Herr Schmidt that we should distinguish the two products by prefixing the name of the plant from which each is derived. Ledenburg[†] says, doubtless Daturine, Hyoscyamine, Atropine, and Duboisine are identical.

The following points of difference are, however, distinguishable between the two alkaloids: The crystals are said to differ somewhat in form;[‡] datura-atropine is levogyrate, while atropá-atropine is non-rotary;[§] platinic chloride precipitates atropa-atropine salts, but not salts of datura-atropine, and picric acid precipitates datura-atropine, but not atropa-atropine;[||] atropa-atropine is said to be twice as poisonous as datura-atropine;[¶] and it is claimed that datura-atropine is thrice as powerful a dilatant of the pupil as its isomer, and that the dilation lasts longer.[**]

Atropa-atropine or *atropine,* $C_{17}H_{23}O_3$ as purified after its extraction from the flowering Belladonna, forms prisms, having a nauseous, bitter and burning taste, and causing a dryness of the mouth and fauces, with constriction of the throat. Even in very small doses it produces congestive headache and dilatation of the pupil. It is readily soluble in alcohol, less so in water; its solubility is increased in each by the addition of heat. It fuses at 90° (194° F.); and at 140° (284° F.) it breaks down, the greater portion being destroyed; by farther heating on platinum-foil it bursts into a flame, and the slight residue soon vanishes.

Stramonin.—This chemically uninvestigated body was separated from the tincture of the seeds, by Trommsdorf.[††] It is described as a white, tasteless powder; sparingly soluble in alcohol, insoluble in water and fusing at 150° (302° F.).

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[*] *Am. Jour. Phar.*, XXIII., 38.

[†] *Berichte. der Chem. ges.*, 1880, 380.

[‡] Erhard, 1866.

[§] Poehl, *Petersb. Med. Wochensch.*, 1877, No. 20.

[||] Poehl, l. c.

[¶] Schroff.

[**] Jobert, *Ann. de Therap.*, 1863, 28.

[††] Wittstein, l. c.

Brandes, in his analysis of the seeds, extracted a fixed oil, fat oil, fatty matter, wax, resin insoluble in ether, red extractive matter, uncrystallizable sugar, gum, gummy extractive, malic acid, and various uncharacteristic bodies.

PHYSIOLOGICAL ACTION.—Datura Stramonium acts very powerfully upon the cerebro-spinal system, causing a line of symptoms showing it to be a narcoto-irritant of high degree. The symptoms collated from many cases of poisoning by this drug are: Vertigo, with staggering gait, and finally unconsciousness; stupor and deep sleep, with stertorous breathing; mania, with loquaciousness or melancholia; hallucinations of terrifying aspect, the patient bites, strikes and screams, and throws the arms about, or picks and grasps at unattainable objects; congestive headaches, with dull beating and throbbing in the vertex. The pupils are dilated, and the patient suffers from photophobia, diplopia and hemeralopia; the eyes are wide open, staring, and set, or are contorted, rolling, and squinting. The face becomes red, bloated, and hot, the mouth spasmodically closed, and the tongue dry and swollen; the patient suffers greatly from thirst, but the sight of water throws him into a spasm and causes great constriction of the throat, foaming at the mouth, and other symptoms similar to those of hydrophobia. There is often nausea, but seldom vomiting. The sexual functions are often excited, more especially in women, in whom it causes nymphomania. Spasms of the muscles of the chest are of frequent occurrence; inspiration is slow and expiration quick. Paralysis of the lower limbs and loss of speech, with twitchings and jerkings of muscles often mark a case. Its action will be seen to be similar to that of Belladonna, yet differing in many respects.

A few of the many cases of poisoning by this plant will serve to show its mode of action:

Beverly states* that some of the soldiers sent to Jamestown to quell the rebellion of Bacon, gathered the young sprouts of Stramonium and ate them as a potage, "the effect of which was a very pleasant comedy, for they turned natural fools upon it for several days. One would blow up a feather in the air, another would dart straws at it with fury; another, stark naked, was sitting up in a corner like a monkey, grinning and making maws at them; a fourth would fondly kiss and paw his companions, and smile in their faces with a countenance more antic than any in a Dutch droll. A thousand simple tricks they played, and after eleven days returned to themselves again, not remembering anything that had passed." J. R. Dodge states† that "*Datura meteloides* grows abundantly on the Colorado River, in Arizona, and that the Mohave Indians gather the leaves and roots, bruise and mix them with water, and after being allowed to stand several hours, the liquid is drawn off. It is a highly narcotic drink, producing a stupefying effect, which is not very easy to remove. The Mohaves will often drink this nauseous liquid, as they are very fond of any kind of intoxication." The California Indians use a decoction of this species to stimulate young females in dancing. The Pah-Utes call the plant *Main-oph-weep;* they ferment in the sun a watery infusion of the bruised seeds, and drink the liquor for the purpose of intoxication.* Dr. Schlesier met a case† in which the subject, a boy, æt. 4, mistook the fruit of Stramonium for poppy heads, and ate a quantity of them. "Soon afterwards his face was flushed, his eyes were glistening and in constant motion, the pupils much dilated, and the countenance was that of an intoxicated person. He sat up in bed quite unconscious, but continually babbling and occasionally starting up suddenly, his hands apparently directed at imaginary objects in the air. His pulse was very slow; there was no fever, but intense thirst and violent perspiration from incessant motion." Dr. Turner‡ describes the effects upon two children who had eaten the seeds: "In an hour and a half they were fully under the influence of the poison. They were lying on their backs, eyes bright, pupils widely dilated and insensible to light, conjunctiva injected, faces deeply suffused, and of a dark-crimson color; difficulty of breathing, inability to articulate, and in a state of complete insensibility, broken occasionally by a paroxysm, during which they would utter some indistinct sounds and throw their hands about, as if trying to ward off some threatening evil. They then fell into a comatose state, but were easily roused into a state of violent excitement; they grasped at imaginary objects; there was picking of the bedclothes, with paroxysms of excessive laughter."

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* *Hist. of Virginia*, 121.

† *U. S. Agric. Rep.*, 1870, 423.

The Thugs, a society of stealthy fanatic murderers of India, often employ *D. fastuosa* and *alba* to render their intended victims unconscious.

On Animals.—Orfila found that half an ounce killed a dog within twenty-four hours; and a quarter of an ounce applied to an open wound in another, killed him in six hours. The symptoms in each case showed that the effects were produced upon the nervous system in general.

Post-mortem.—The blood was found to be semi-fluid throughout the body, the few coagula that are met with in the auricles and large veins are very thoroughly formed and easily broken down. A slight injection of the mucous membrane of the larynx, pharynx, and upper portion of the œsophagus was observed. The rima glottidis was thickened and very turgid. The alimentary tract, however, was found absolutely normal.§

From the symptoms caused by this drug, its homœopathic adaptability to hydrophobia will be at once evident. There is no drug so far proven that deserves as thorough and careful a trial in this dread disease as Stramonium. The following, from a letter written by the Catholic Bishop of Singapore to the *Straits Times*, has just come to my notice. This bishop says he thinks it his duty to publish the remedies used in the missions in Tonquin for the cure of hydrophobia. These, he says, consist first, in giving as much star-aniseed as may be contained on a cent piece; and secondly, in making the patient take some water in which a handful of the leaves of stramony, or thorn-apple, or pear-apple, is infused. These will cause an access of the convulsions or delirium, during which the patient must be tied; but on its abatement he will be cured. If the remedy act too violently, either by too much being administered, or on account of there being no virus of real hydrophobia, the consequences may be ameliorated by making the patient drink an infusion of licorice root, a most precious antidote against poisoning by stramony. In 1869, the bishop relates, a very honorable member of the clergy of Paris was bitten by a pet dog, which died thirty hours afterwards with the most characterized convulsions of rabies. The following day he felt the first symptoms of the dreadful disease, and these augmented in intensity every day. The priest, however, applied at once all sorts of known remedies, ancient and modern, and even employed a very small dose of stramony. Each time he used the latter the progress of the disease ceased for some hours, even days, and then continued its ravages with greater intensity than before. When the fatal issue was at hand, just at the crisis of the disease, when the paroxysms had attained the greatest violence, the patient, with almost superhuman energy, began chewing a pinch of dried stramony leaves, swallowing the juice. The effect was not long in making itself felt. In half an hour the disease had attained its height, the patient being delirious during the convulsions; but on the following day he was perfectly cured. "The same remedy," concludes the bishop, "is used in India, and is always successful."

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* Dr. Edward Palmer in *Am. Nat.*, 1878, 650.

† Canstatt's *Jahrbuch*, 1844, 297.

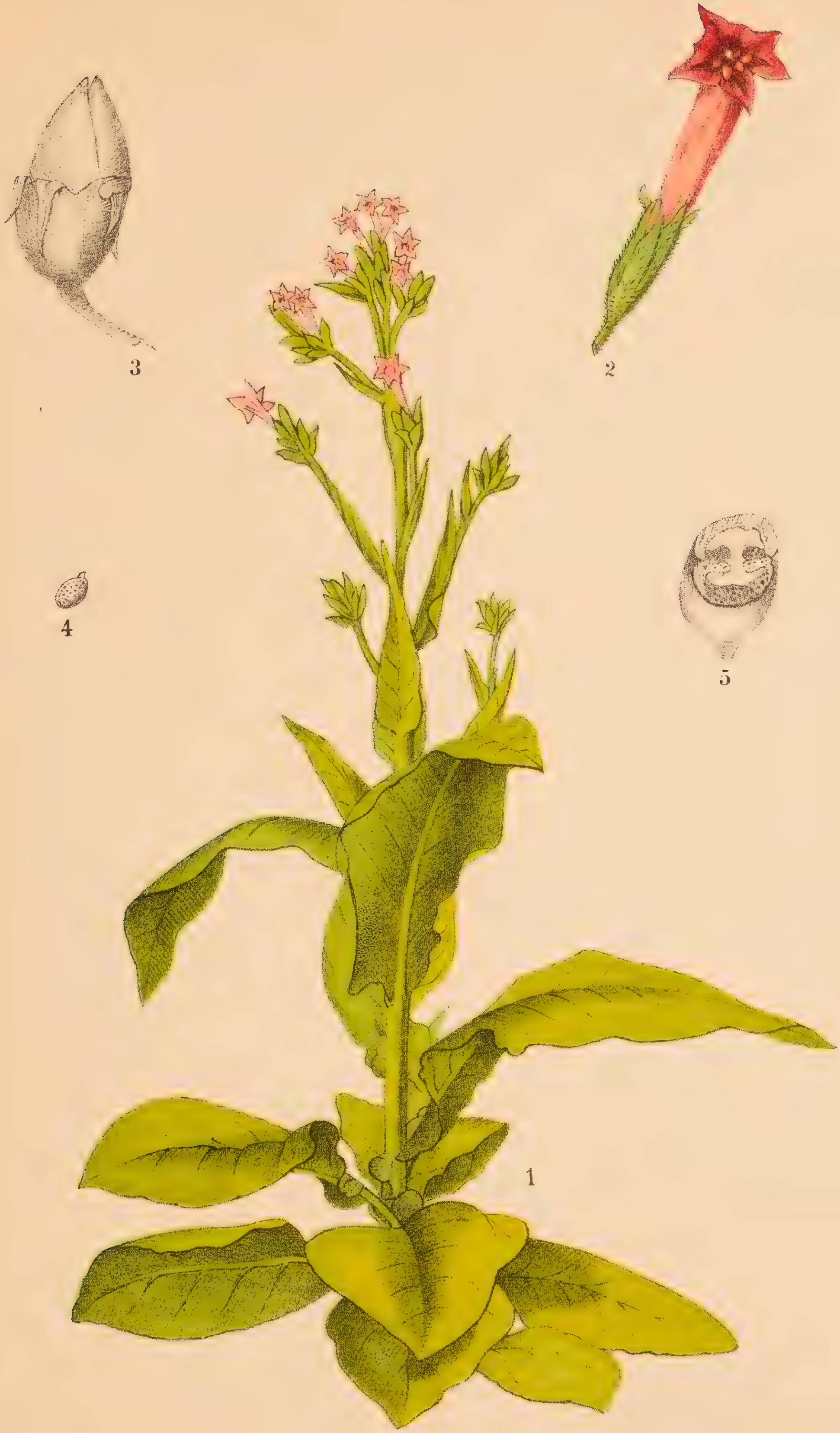
‡ *Am. Jour. of Med. Sci.*, 1864, 552.

§ Mr. Duffin's case (his youngest daughter), *Lancet*, 1845, 195.

DESCRIPTION OF PLATE 127.

1. End of a flowering branch and portion of the main stem, Jersey City, N. J., July 10th, 1884.
2. Stamen.
3. Ovary.
4. Stigma.
5. Pollen x 200.

(2–4 enlarged.)



Cm. ad nat. del. et pinxt.

NICOTIÀNA TABACUM, Linn.

Tribe.—NICOTIANEÆ.

GENUS.—**NICOTIANA**,* LINN.

SEX. SYST.—PENTANDRIA MONOGYNIA.

TABACUM.

TOBACCO.†

SYN.—NICOTIANA TABACUM, LINN., NICOTIANA MACROPHYLLA, SPRENGEL, LEHM., HYOSCYAMUS PERUVIANUS, GERARD.
COM. NAMES.—TOBACCO; (FR.) TABAC; (GER.) TABAK.

A TINCTURE OF THE LEAVES OF NICOTIANA TABACUM, L. A TINCTURE OF THE ALKALOID NICOTINUM.

Description.—This largely cultivated, rank, acrid, annual herb, the base of the most wide-spread of all narcotic habits, grows to a height of from 4 to 6 feet at its flowering season. *Root* long, fibrous and tap-shaped. *Stem* erect, simple, cylindrical, solid and viscid-pubescent. *Leaves* alternate, bright-green upon the upper surface, paler beneath, those of the base more or less petioled, large and broad, ovate and from one and one-half to two feet long, by from 10 to 18 inches broad; those of the upper part of the plant more or less amplectant, oval-oblong or oval-lanceolate, all entire acute and glandularly pubescent. *Inflorescence* a terminal spreading panicle of rose colored or white flowers; *bracts* lanceolate, acute. *Calyx* inflated-tubular or campanulate, 5-cleft, viscid-hairy; *teeth* narrow-lanceolate, acute. *Corolla*; *tube* funnel-form, clammy-pubescent, from one and one-half to two inches long; *limb* salver-form, plaited, 5-cleft, the lobes acute and broadly triangular. *Stamens* 5, equal or nearly so; *filaments* inserted upon the base of the corolla and nearly as long as the tube; *anthers* small, opening longitudinally. *Ovary* ovate, 2-celled; *style* slender, about equal in length to the filaments; *stigma* capitate, 2-lobed. *Fruit* a 2-celled ovate capsule, situated in the cup of the persistent calyx; *dehiscence* septicidal from the apex; *valves* 2, becoming at length separated; *pericarp* papyraceous, thin. *Seeds* innumerable, minute, subcylindrical; *testa* sinuously, raised-reticulate.

History and Habitat.—There seems to be little doubt that tobacco is a native of some portion of South or Central America, where it appears to have been used by the natives as a narcotic from prehistoric times. The first intimation history gives of its use, is the account of the Spaniards with Columbus, who, upon landing at St. Domingo, in 1492, discovered the natives smoking cylinders of the dried leaves, which they called *cohiba*. In 1498 its use was again noted by them upon the British West Indian Island of Tobago. It was either from this island, or from the native word meaning pipe, *tobaco*, that the specific name was derived. Tobacco was quite extensively used by the Spaniards in Yucatan as early as 1520, and from there its use was introduced into Spain by Hernandez de Toledo in 1559; about this time also, it was first grown in Europe, at Lisbon, and from there in 1560, Jean Nicot, ambassador to France, sent seeds, mentioning them as the germs of a medicinal plant of great value. From this circumstance Linnæus honored him with its generic name, *Nicotiana*. In 1585 its use by the Canadian Indians was discovered, and in 1586 it was brought to England by Sir Francis Drake and Sir Walter Raleigh and his companions. About the year 1600 the plant was introduced into Java, Turkey, India and China, though some historians feel confident that the Chinese had used the leaves long before this period, attempting thus to more fully substantiate the theory often promulgated that the Chinese had visited the western shores of America long before the discovery of the eastern coasts by the Spaniards. The rapidity with which this plant has traveled from one extremity of the temperate and torrid zones to the other, notwithstanding the act of English Parliament, the Popish bull, the Russian knout and death, the commands of the priests and sultans of Turkey and Persia, and the edict of the hwang-ti of China, is almost incredible, the very opposition that attended its first introduction into all countries seemed only to urge its onward rush, until it has gained to-day a prominence greater than any other known plant.

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* Jean Nicot, *vide* History and Habitat, p. 128-2.

† Origin somewhat doubtful, *vide idem*.

Besides the true Virginian tobacco (*Nicotiana Tabacum, L.*) for which the genus was composed, the following species and varieties have been determined: *N. rustica, L.*, a species with greenish-yellow flowers, cultivated in Mexico, India, Syria, and Turkey (*Latakia*), and found escaped in the northern United States; *N. Tabacum, var. undulata, Sendtner*, found in Brazil; *N. quadrivalvis, var. multivalvis, Gray*, a relic of aboriginal cultivation in Oregon; *N. Palmeri*, an Arizonian species (Palmer); *N. Clevelandi*, a Californian species (Cleveland); *N. Plumbaginifolia, Viv.*, a Mexican species (Berlandier); *N. fructicosa, L.*, a beautiful species with sharply pointed capsules; *N. persica, Lindl.*, cultivated as the fragrant Shiraz or Persian tobacco; *N. repanda, Willd.*, furnishing the fine Havana and Cuban leaves; *N. quadrivalvis, Pursh.*, used by the Indians along the Missouri river, and called by them *nonehaw*; *N. nana, Lindl.*, the plant of the Rocky Mountain tribes; *N. chinensis*, as cultivated in China and Japan; *N. trigonophylla, Dunal*, *N. Bigelovii, Watson*, and *N. attenuata, Torrey*, the leaves of all of which being used by the Indians of Utah, Arizona, New Mexico and Southern California, and said to be stronger than the cultivated plants (Palmer); *N. lancifolia, Willd.*, and *N. Ybarrensis, HBK.*, to which Prof. Asa Gray refers the *Yaqui Tobacco*, cultivated in Arizona (Palmer); and N. *petiolata*, a variety of cultivation in the United States.

The tobacco plant flowers in temperate regions from June to August, varying with the locality and season.

Tobacco can be raised in its proper soil at almost any point between the equator and the 50th degree N. or S. latitude, the better grades however not above the 35th degree, and the best between the 15th and 35th degrees, north.

The production of this narcotic for its specific use as before intimated is enormous, and increasing rapidly from year to year, the United States alone raising 472,061,175 lbs. in 1880, or nearly double the product for 1870. The estimated annual production of the globe is placed at about 3,000,000 tons! which, taking the world's population at present (1882) to be 1,433,887,600, would furnish each individual, without regard to age, sex, or condition, with over 4½ lbs.

As an habitual narcotic its modes of use are various. I place them here in the order of their harmfulness: Chewing without expectorating, inhalation of the smoke, chewing and expectorating, insufflation of snuff, and smoking without inhalation. The leaves are prepared for use,—after passing through processes which tend slightly to militate against the poisonous properties,—in the form of twists soaked in molasses or liquorice, for chewing, called *plugs;* shredded leaves more or less pure, for chewing or smoking, called *fine-cut;* finely-broken leaves, sometimes bleached, for smoking, termed *granulated tobacco;* rolled into cylindrical forms, either pure or saturated with nitre, as *cigars* and *cheroots;* rolled into small cylinders and wrapped in paper, as *cigarettes;* pulverized and kept dry or damp for insufflation or chewing, as *snuff;* and many other minor forms.

Its exhibition internally as a drug, must be conducted with the greatest care and watchfulness according to the susceptibility of the patient and the potence of the preparation. It was formerly quite esteemed as an anthelmintic, emetic, antispasmodic, cathartic, and sialagogue. Externally its forms of application were many in hemorrhoids, various skin diseases of man and beast, spasma glottidis, rheumatism, ulcers, tumors, and kindred affections.

Its officinal form in the U. S. Ph. is now simply *Folia Tabaci;* its former officinal preparations were dismissed at the 6th revision, 1882. In the Eclectic Materia Medica the preparations are *Infusum Tabaci*, *Oleum Tabaci* and *Unguentum Tabaci.*

PART USED AND PREPARATION.—The generic effects of Nicotiana being almost, if not quite identical in each species, and as the physiological effects have been gathered from all sources, varieties, and uses, the leaves of any fully-developed plant may be used. Place the dried and finely-cut leaves in a bottle, cover them with five parts by weight of alcohol, and allow them to stand at least eight days, well stoppered, in a dark, cool place. The tincture may then be pressed out and filtered. If prepared from Havana leaves, which contain the smallest percentage of nicotia, it presents a clear orange-brown color by transmitted light, the characteristic penetrating odor and taste of the plant, and only a slight acid reaction.

Nicotinum.—A Solution of one part by weight of the volatile alkaloid *nicotia* in 99 parts of absolute alcohol.

CHEMICAL CONSTITUENTS.—Nicotia,* $C_{10}H_{14}O_2$. This volatile alkaloid exists in the leaves and seeds of all species of the genus nicotiana, from which it may be extracted by aqueous or alcoholic distillation. The process best calculated to extract the full amount is Laiblin's modification of that of Schlœsing,† substantially as follows: The cut leaves and stems are placed in some convenient apparatus, covered to a good depth with water, and allowed to digest 24 hours or more, then heated by means of superheated steam for half an hour, filtered and pressed. The mass is again dealt with in the same way, and the resultant liquids united and evaporated to one-third. Ten per cent. of the original weight of the tobacco of slaked caustic lime is now added, and the whole subjected to distillation by steam, until the disgusting odor of nicotia is no longer perceptible from the still. The distillate is now neutralized by a known weight of oxalic acid and evaporated to a thin syrup, the requisite amount of potassa to neutralize the known quantity of acid is now added, which causes a separation of the crude nicotia; this is collected and the menstruum treated with ether to extract the remaining alkaloid. Both resultants are now mixed, purified by distillation with hydrogen, solution in ether, shaking with powdered oxalic acid, solution again in ether, decomposing with potassa and redistillation in hydrogen. The distillate (Nicotia) is a colorless pure liquid, having a peculiar repulsive acrid odor not resembling tobacco, a burning taste, strong alkaline reaction, turning brown when exposed to light and air, and a specific gravity of 1.048 at 0° C. (32° F.). It boils at 250° C. (482° F.), is soluble to any quantity in water, alcohol or ether, and completely saturates acids.

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* Nicotina, nicotin, nicotylia, nicotine, tabacine.

† *Annal. d. chem.*, vol. 196, p. 130.

The question as to the presence of nicotia in tobacco smoke, a point quite necessary to determine, seems still unsettled, many chemists of note having failed to detect its presence, while others find it in considerable quantity without apparent trouble. Vohl and Eulenberg (1871) conclude that nicotia is completely decomposed in the process of smoking, while Kissling (1882) in a comprehensive essay* criticises their process, and judges that their analysis was incorrect. He also criticises the analyses of Heubel, Le Bon and Pease, who found nicotia, and reports its presence in his own analysis. The smoke contains, according to Vohl and Eulenberg, who have made careful analyses,† *pyridine*, $C_5 H_5 N$; *piccoline*, $C_6 H_7 N$; *lutidine*, $C_7 H_9 N$; *collidine*, $C_8 H_{11} N$; *parvoline*, $C_9 H_{13} N$; *coridine*, $C_{10} H_{15} N$; *rubidine*, $C_{11} H_{17} N$; and *viridine*, $C_{12} H_{19} N$; all of which are bases occurring in coal-tar, and in Dippel's oil (*Oleum Animale Dippelii*), a product of the dry distillation of bones and other animal matter. Besides these another hydrocarbon, $C_{38} H_{18}$; carbonic anhydride; hydrocyanic acid; sulphuretted hydrogen; acetic anhydride; formic, propionic, butyric, valeric and carbolic acids; creosote; several hydrocarbons of the acetylene group; ammonia; methane and carbonic oxide were found present.

Oleum Tabaci.—This empyreumatic, tarry liquid doubtless contains many of the hydrocarbons mentioned above, and mixed with nicotia is in great part that subsidence found in the smoker's pipes.

Nicotianin.—Tobacco Camphor.—$C_{20} H_{32} N_2 O_3$. Hermbstadt (1823) observed floating separate upon the surface of an aqueous distillate of tobacco leaves, white laminæ, to which he gave the above name. Nicotianin consists of white, scale-like crystals, having a bitter aromatic taste, soluble in water, alcohol and ether, and emitting a tobacco-like odor.

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* Quoted in *Jour. Chem. Soc.*, August, 1882.

† *Vierteljahrsschr. f. gerichtl. und offentl. Medicin*, N. ed., Vol. 14, p. 249.

Nicotinic Acid.—$C_5H_4N, CO.OH$, was first discovered by Huber, who subsequently recognized it as *carbopyridenic acid.* Weidel afterward separated this principle from nicotia by the use of nitric acid, and deemed his product identical with that of Huber; he gave it the formula $C_{10}H_8N_2O_3$.* Laiblin, however, (1879)† after successive tests favors the formula of Huber. This acid forms colorless, sublimable crystals, possessing a strongly acid taste.

Oil of Nicotiana Tabacum.—The fixed oil of the seeds, according to Wittstein, is golden-yellow, mild and inodorous, having a density of 0.917. A corresponding or identical oil, $C_{11}H_{22}O_2$, is found (Zeise) in *Oleum Tabaci.*

Tabacose.—The presence of this tobacco sugar has been determined by Prof. Attfield‡ in amounts varying in different samples, from about 5–10 per cent. The precise nature of this saccharose body is not yet known.

Besides the above the plant contains gum, mucilage, tannin, and from 15 to 30 per cent. of inorganic matters, salts of potassium, calcium and magnesium, as sulphates, phosphates, malates, nitrates and probably citrates, these latter differing in quantity according to the nature of the soil in which the individual grows, and showing it to be a very exhaustive crop.

PHYSIOLOGICAL ACTION.—The important question of whether the use of tobacco in moderation is harmful or not, has been decided in the negative by many of the highest authorities. It would seem that he who can use it at all, and who notes no symptoms from its moderate exhibition, is not particularly injured. In this as with all other drugs, it must be remembered, that what is moderation in one individual is often excess in another, and that, therefore, the dose, whether taken as a remedy or otherwise, must in all cases be suited to the particular individual under consideration. Concerning the many essays that are written upon this subject, the fact that all of them show to a careful reader whether the writer is a user or not, renders them very unsatisfactory and more or less faulty through partisanship.

Chronic effects.—It is almost an impossibility to gain a systematic knowledge of the chronic effects of tobacco poisoning, though the sources of information upon this subject would seem at first to be excellent. The effects produced upon smokers are almost useless in the study of the *drug* itself, and it is only in that class of chewers who swallow the juice, that positive data could be looked for; still here, as well, we are at a loss to determine facts, for in manufacturing the narcotic processes are used which alter the product greatly; nevertheless some few symptoms seem to be more or less common to all who have been for protracted periods subjected to the drug. Mental anxiety and irritability, with at times confusion of ideas; dilation of the pupils; ringing in the ears; increased secretion of saliva; uncertainty of speech; dryness of the throat; at times weakness of the stomach and nausea; increased secretion of urine; dry cough especially at night; præcordial oppression with palpitation of the heart and at times an irregular pulse; trembling of the extremities when held long in one position; general anæmic condition of the blood; spasmodic contractions or jactation of single muscles; sensations of exhaustion and especially lassitude; sleepiness; profuse perspiration, and sensitiveness to cold.

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* Laiblin, *Jour. Chem. Soc.*, October, 1879, quoted from *Liebig's Annalen.*

† Ibid.

‡ *Pharm. Jour. Trans.*, Jan. 12, quoted in *Am. Jour. Phar.*, 1884, p. 147.

It would seem to be a fact, that in habitual users of this or any other toxic drug, the drug acts more or less as its own antidote, for immediately upon discontinuance of its use the preponderance of its symptoms arise.

The effects of tobacco or its alkaloid nicotia in toxic quantities, when taken into the stomach, injected into the rectum, or applied to a denuded surface are:

Ante-mortem.—Faintness, vertigo and trembling, with extreme nausea, torpor, stertorous breathing, weak irregular pulse, relaxation of the muscles, and vomiting; followed by severe spasms or paralysis, advancing coldness of the extremities, collapse with cold sweat, and death.

Post-mortem.—Excessive cadaveric rigidity, a general contraction and congestion of all hollow organs; the heart, stomach, intestines, kidneys and bladder; a congestion of the cerebellum, liver, portal and mesenteric veins, and mucous membranes either as a whole or only in patches. The blood is found everywhere very dark and liquid.

On Animals.—Johnston states* that the Hottentots are said to kill snakes by placing a drop of the empyreumatic oil of tobacco upon their tongues. Death follows instantly as by an electric shock, or a dose of hydrocyanic acid. The action of nicotia upon small species seems to be in general almost as instantaneous as above; especially upon the *carnivora*, where its action seems more intense.

Tobacco, then, from the foregoing facts, acts as a severe irritant to the ganglionic centers, producing thence an action at first paralytic, then spasmodic, affecting the sympathetic, motor and vaso-motor systems.

DESCRIPTION OF PLATE 128.

1. Whole plant, eight times reduced, from a cultivated specimen. Chemung, N. Y., Sept. 11, 1879.
2. Flower.
3. Fruit.
4. Seed (somewhat enlarged).
5. Section of fruit.

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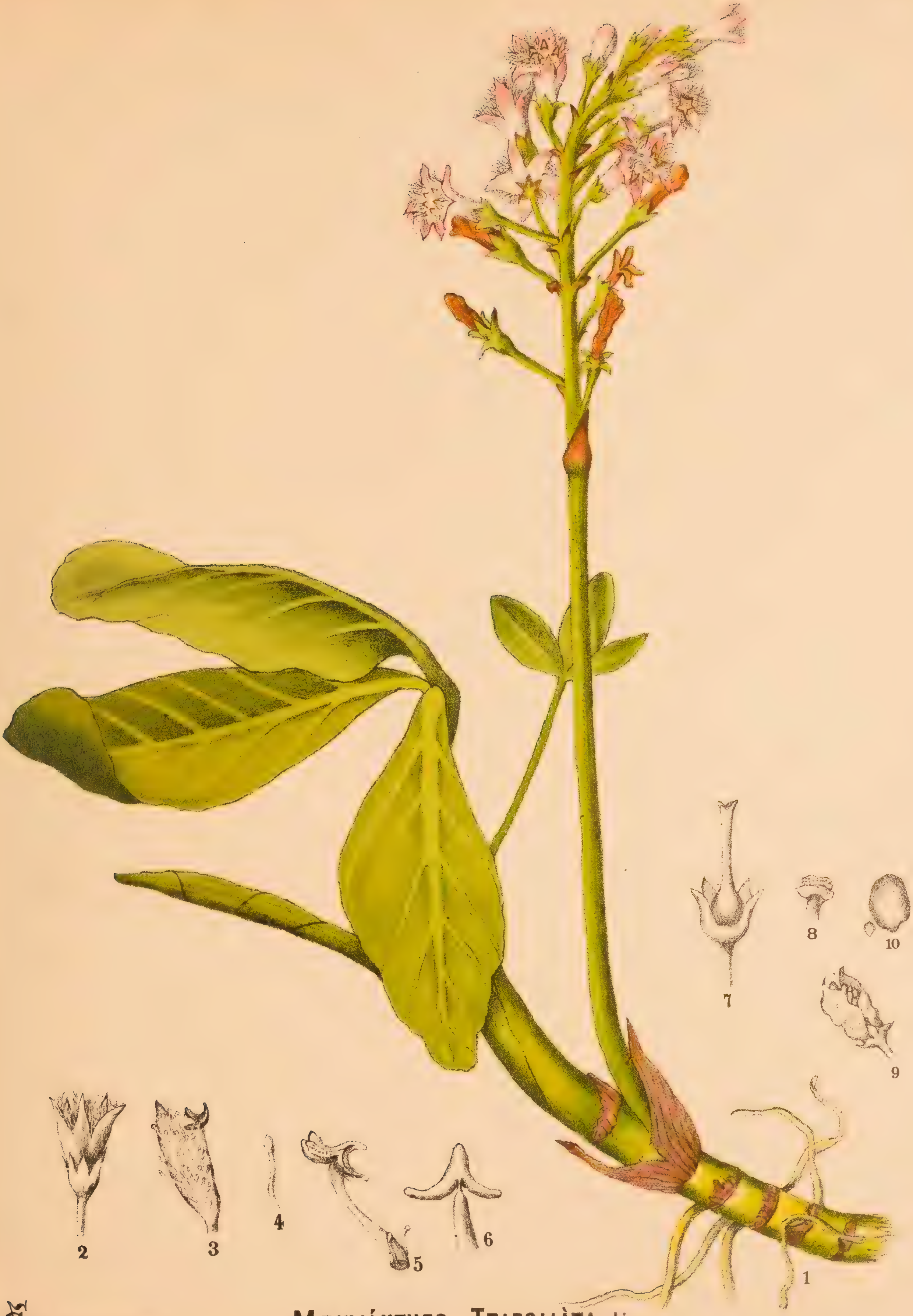
* Chem. of Com. Life, Vol. II., p. 28.



F.M. ad nat del. et pinxt.

MENYÁNTHES TRIFOLIÀTA, Linn.

N. ORD.—GENTIANACEÆ.

Tribe.—MENYANTHEÆ.

GENUS.—**MENYANTHES**,* TOURN.

SEX. SYST.—PENTANDRIA MONOGYNIA.

MENYANTHES.

BUCK BEAN.

SYN.—MENYANTHES TRIFOLIATA, LINN.; MENYANTHES VERNA, RAF.; TRIFOLIUM PALUDOSUM, GER.; TRIFOLIUM FIBRINUM, G. PH.

COM. NAMES.—BUCK BEAN, BOG BEAN, MARSH TREFOIL, MARSH CLOVER, WATER SHAMROCK, BITTER ROOT; (FR.) MENYANTHE TREFLE, TREFLE D'EAU; (GER.) BACHSBOHNE, BITTERKLEE, FIEBERKLEE.

A TINCTURE OF THE WHOLE FRESH PLANT MENYANTHES TRIFOLIATA, LINN.

Description.—This beautiful bog perennial is characterized as follows: *Rootstalk* horizontal, creeping, long, thick, sub-cylindrical, and conspicuously marked by the remains of the sheaths of previous petioles; *roots* long, at first stout and simple, then attenuated and greatly branched. *Leaves* alternate, trifoliate, midribs very prominent and conspicuously pale; *petioles* long and thick at the base, where they are surrounded by large membranaceous sheathing bracts; *leaflets* oval or oblong, situated at the summit of the petiole; *margins* entire, or sometimes slightly crenate or obscurely serrate. *Inflorescence* a simple, terminal, pyramidal raceme; *scape* naked, arising from the axils of the previous year's leaves; *bracts* ovate, membraneous, obtuse, shorter than the pedicels; *flowers* 10 to 15, white or pinkish. *Calyx* persistent, much shorter than the corolla; *limb* 5-parted, the segments oblong-obtuse. *Corolla* deciduous, infundibuliform; *limb* 5-parted, spreading, its whole upper surface densely bearded; *æstivation* induplicate. *Stamens* scarcely one-half the length of the corolla; *anthers* oblong, sagittate. *Style* slender, persistent, somewhat exserted; *stigma* capitate, 2-lobed. *Fruit* a 1-celled, ovoid capsule; *pericarp* thin, pale brown; *dehiscence* irregular, but more or less loculicidal; *placentæ* in the middle of the valves. *Seeds* numerous, minute; *testa* hard, rough, and shiny.

Gentianaceæ.—A large order of smooth herbs, having a colorless, bitter juice, and scattered throughout all portions of the globe. *Leaves* generally opposite, sessile, and entire (Exc. Menyantheæ); *stipules* wanting. *Inflorescence* solitary, cymose or racemose; *flowers* regular and showy. *Calyx* persistent; *corolla* marcescent, funnel- or salver-form. *Stamens* as many as the lobes of the corolla, and inserted upon its tube. *Styles* united or absent; *stigmas* 2-lobed. *Ovary* 1-celled or imperfectly 2-celled; *placentæ* 2, parietal, or sometimes the whole inner surface of the ovary placentiferous. *Fruit* a 2-valved capsule; *dehiscence* septicidal. *Seeds* small, anatropous; *embryo* minute, straight, and axial; *albumen* sarcous.

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* Μηνίανθος, μήνη, *mene*, month; ἄνθος, *anthos*, flower; from its reputed power in promoting menstruation.

Besides Menyanthes, this order furnishes our Materia Medica three other proven species, viz.: The Chilian Centaury or Canchalagua (*Erythræa Chilensis*, Pers.); the Austrian Cross-wort (*Gentiana cruciata*, L.); and the European Yellow Gentian (*Gentiana lutea*, L.).

Many other species are used in medicine, principal among which are the following species of Gentiana, which often figure as substitutes for *G. lutea:* The North American *G. Catesbaei*, Walt.; and the European *G. amarella*, L.; *campestris*, L.; *purpurea*, L.; *pannonica*, Murr.; and *punctata*, L. The Indian *Gentiana Kurroo*, Royle, is used in its country in a similar manner to *G. lutea* in Europe. The North American Columbo (*Frazera Carolinensis*, Walt.) has, when fresh, properties quite similar to *G. lutea;* as have also the European Centuary (*Erythræa Centaurium*, Pers.), and *Chlora perfoliata*, L. The Indian Chiretta (*Ophelia Chirayta*, Don) is bitter, tonic, and febrifuge, and is used by English physicians in India as a substitute for Cinchona. The East Indian *Cicendia hyssopifolia*, Wright & A., is tonic and stomachic. The American Centaury (*Sabbatia angularis*, Pursh.) is a bitter tonic and febrifuge, often employed in remittent and intermittent fevers. The South American *Lisianthus purpurascens*, Aubl., *pendulus*, Mart., *grandiflorus*, Aubl., and *amplissimus*, Mart., are claimed to be extremely bitter tonics, esteemed as febrifuges and anthelmintics, as are also the European *Villarsia nymphæoides*, Vent., and the Cape of Good Hope *V. ovata*, D. C. The Guianian *Coutoubea spicata*, and *C. ramosa*, Aubl., are bitter tonics, much used as emmenagogues, anthelmintics, and for the removal of intestinal obstructions. *Limnanthemum Indica* is accounted a holy plant by the Chinese, in consideration of its many virtues; *L. nymphoides* is febrifugal; while the leaves of *L. peltata* are eaten in Japan as a potage.

A peculiar property pervades the whole of this natural order—the species when fresh are all emetic and cathartic, and, when dry, tonic and stomachic in varying degrees.

History and Habitat.—The Buck Bean is a native of the temperate regions of the Northern Hemisphere, from Alaska throughout the northern portions of North America, south of Greenland, Iceland, Scotland, Norway, Sweden, Russia, and eastward to the confines of Siberia. In the United States it extends southward as far as Wisconsin in the west and Pennsylvania in the east. It habits freshwater bogs, marshes, and ditches which retain water throughout the summer season, and blossoms in May and June.

The previous uses of the dried plant in medicine were all dependent more or less upon its so-called tonic action; while in a fresh state it was used as an energetic cathartic. As early as 1613 a Swedish writer, Johannes Franckenius, states that a decoction of the herb removes all visceral obstructions, acts as an emmenagogue and diuretic, kills intestinal worms, and is an efficacious remedy in scrofula. Besides its use in amenorrhœa, Menyanthes was considered valuable in the treatment of atonic dyspepsia, and derangements of the digestive tract, as well as a useful remedy in remittent and intermittent fevers.

Cullen speaks of the root as efficacious in obstinate cutaneous affections of a seemingly cancerous nature; Boerhaave claims to have relieved gout in his own case by drinking the juice of the plant in whey. Dr. Alston remarks "that this plant has remarkable effect in the gout in keeping off the paroxysms, though not to the patient's advantage." The general use of Menyanthes has been mostly as a substitute for gentian and columbo.

In Sweden the leaves are often used in brewing; two ounces of which are said to equal a pound of hops, for which they are substituted. Linnæus notes that in Lapland, in times of scarcity, the dried and powdered roots have been used, mixed with meal, in bread-making; he, however, characterizes the result as "amarus et detestabilis," which one can readily imagine, as neither dryness nor heat removes the bitterness of the roots.

PART USED AND PREPARATION.—The whole fresh plant, gathered when budding to blossom, is to be chopped and pounded to a pulp, enclosed in a piece of new linen and subjected to pressure. The expressed juice is then, by brisk agitation, mingled with an equal part by weight of alcohol. This mixture should then be poured into a well-stoppered bottle, and allowed to stand eight days in a dark, cool place. The tincture, separated from the mass by filtration, should be opaque, and in thin layers present a deep olive-green color by transmitted light. It should have a strong herbaceous odor, a lasting, extremely bitter taste, and a strong acid reaction.

CHEMICAL CONSTITUENTS.—Menyanthin, $C_{33}H_{54}O_{16}$.* This uncrystallizable glucoside is derivable from the whole plant; when pure it exists as a white, bitter powder that is freely soluble in water and alcohol, but insoluble in ether. Menyanthin softens at 60°–65° (140°–149° F.), becomes liquid at 115° (239° F.), and carbonizes at higher temperatures.

Menyanthol, C_8H_8O.—This body, together with a brown resin and glucose, is formed by the destruction of Menyanthin with dilute sulphuric or muriatic acid. It results as an oily liquid, possessing a burning taste and a penetrating odor, similar to that of oil of bitter almonds.

Menyanthic Acid.—When Menyanthol is exposed to the air for some time it is oxidized to a white crystalline mass of unknown chemical composition, which is at present provisionally known by this name.

The analysis of Trommsdorf† resulted in the separation of albumen, resin, malic acid, "a peculiar matter precipitated by tannin," gum, inulin, and a bitter principle, which Brandes‡ succeeded in gaining as an amorphous mass of mostly yellowish-white grains (impure Menyanthin). Tilden's analysis§ corresponds with that of Trommsdorf, but does not specify the amylose body found as inulin.

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* Kromayer and Froehde, *Phar. Jour.*, ser. 2, vol. iii., 579.

† *Ann. de Chim.*, lxxii., 191.

‡ *Phar. Jour.*, ser. 1, vol. ii., 660.

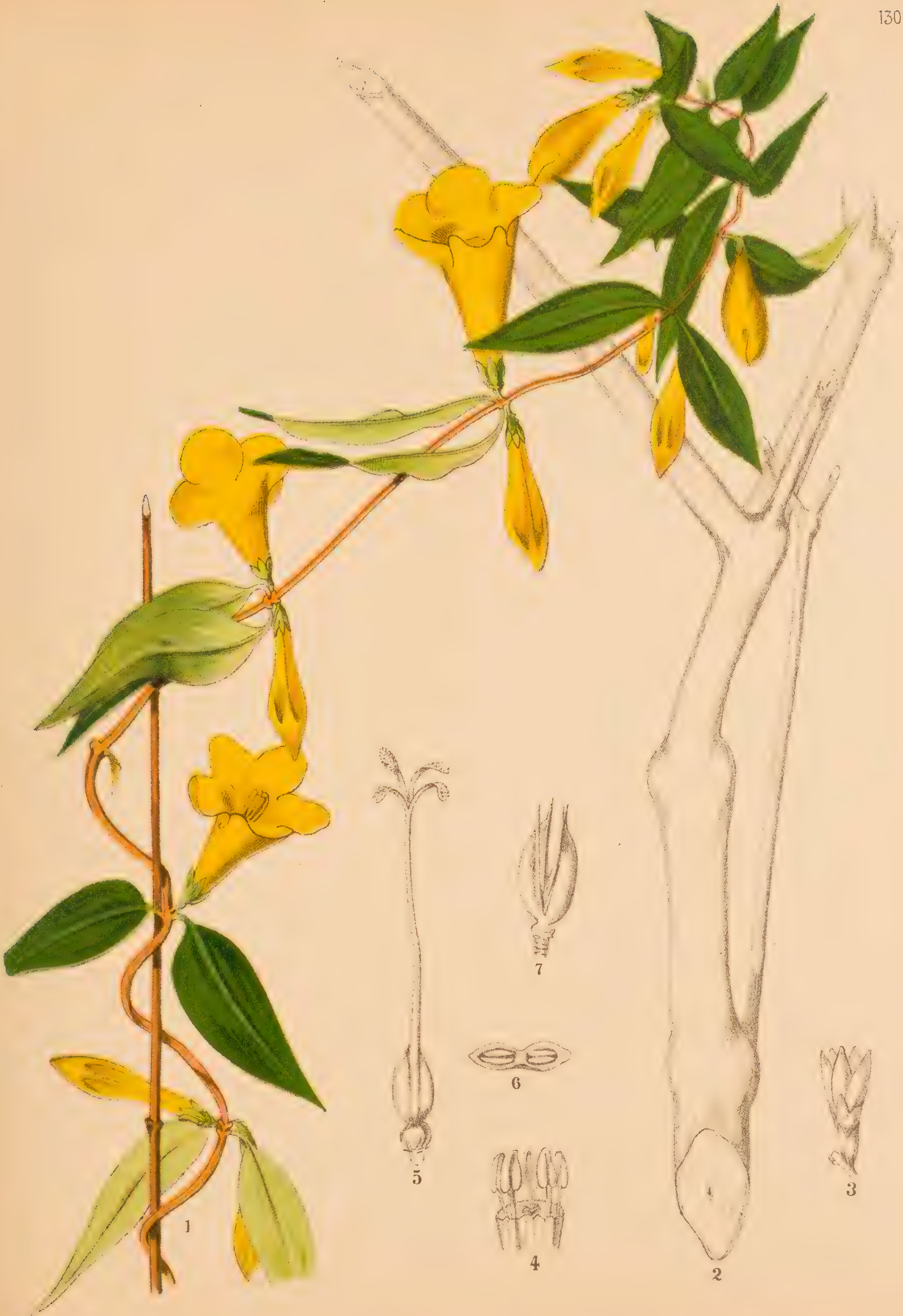
§ *Jour. Mat. Med.*, N. S., vol. ii., 90.

PHYSIOLOGICAL ACTION.—Large doses of the root of this plant cause profuse vomiting and purging, together with exhausting diaphoresis. Smaller doses cause confusion and vertigo, pressive headache, dimness of vision, contraction of the pupil, twitching of the facial muscles, a sensation of coldness in the stomach and œsophagus, followed by nausea, distension and fulness of the abdomen, with griping, constipation, frequent desire to urinate with scanty discharge, oppression of the chest with increased respiration and accelerated pulse, cramps in the legs, sleeplessness, coldness of the extremities, followed by fever without thirst, and extreme weakness of the whole body.

DESCRIPTION OF PLATE 129.

1. Whole plant, Appalachin, N. Y., June 2d, 1885.
2. Flower.
3. Petal and stamen.
4. A hair of the corolla.
5. Stamen, with open anther.
6. Anther, showing under surface.
7. Pistil.
8. Stigma.
9. Fruit.
10. Seed, natural size and enlarged.

(2–8 enlarged.)



C.F.M. ad nat del. et pinxt.

GELSÉMIUM SEMPÉRVIRENS, Aiton.

GENUS.—**GELSEMIUM**,* JUSS.

SEX. SYST.—PENTANDRIA DIGYNIA.

GELSEMIUM.†

YELLOW JESSAMINE.

SYN.—GELSEMIUM SEMPERVIRENS, AIT.; GELSEMIUM LUCIDUM, POIR.; GELSEMIUM NITIDUM, MICHX.; GELSEMIUM SEU JASMINUM LUT. ODOR. ETC., CATESBY; BIGNONIA SEMPERVIRENS, LINN.; ANONYMOS SEMPERVIRENS, WALT; LISIANTHUS SEMPERVIRENS, MILL.

COM. NAMES.—YELLOW JESSAMINE OR JASMINE, FALSE JASMINE, WILD JESSAMINE, WOODBINE;‡ (FR.) JASMIN JAUNE; (GER.) GELBER JASMIN.

A TINCTURE OF THE FRESH ROOT OF GELSEMIUM SEMPERVIRENS, AIT.

Description.—This beautiful, evergreen, woody, twining plant, often attains great heights, its growth depending somewhat upon its chosen support. *Root* long, ligneous, varying from nearly two inches in diameter to a few lines; *root-bark* of a cinnamon-brown color, and about two lines in thickness; *wood* light-yellow. *Stems* branching, at first with a more or less smooth, light slate-colored bark, then smooth and purplish. *Leaves* opposite, persistent, on short petioles; shining, lanceolate or ovate-lanceolate, bright green above and pale beneath; *stipules* inconspicuous. *Inflorescence* small axillary clusters; *flowers* sweet scented, on scaly bracted pedicels. *Calyx* small; *lobes* 5, imbricated, nearly distinct, ovate and acute. *Corolla* large, from 1 to 1½ inches long, open funnel-form; *lobes* 5, nearly equal, rounded and imbricated. *Stamens* 5, inserted on the base of the corolla-tube; *filaments* equal; *anthers* long, sagittate, adnate, and extrorse. *Ovary* elliptical, smooth, compressed, 2-celled; *ovules* several in each cell, ascending; *style* long and slender; *stigmas* 2, each bifurcated, the lobes linear and equal. *Fruit* an ovoid oblong, beaked, pendent capsule; *pericarp* papyraceous, splitting septicidally into two scaphoid valves. *Seeds* many, imbricated, light-brown, surrounded by a thin, flat, membranous border, which is prolonged at one extremity into a slightly wrinkled wing.

Loganiaceæ.—This order is composed of herbs, shrubs, or trees, and forms a connective between the orders *Gentianaceæ*, *Apocynaceæ*, *Scrophulariaceæ*, and *Rubiaceæ*. Its distinguishing characteristics are: *Leaves* opposite and entire; *stipules* present or represented by a stipular line. *Flowers* regular and perfect, 4-5-merous and androus. *Ovary* free from the calyx.

The Loganiaceæ of our Materia Medica are: Ignatia (*Strychnos Ignatii*,

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* Gelsemino, the Italian for Jessamine.

† Not Gelsemi*n*um.

‡ The only woodbine in this country is *Lonicera grata, Ait.* (Caprifoliaceæ).

Berg.) ; Nux (*Strychnos Nux-Vomica, Linn.*) ; Indian pink (*Spigelia Marilandica, Linn.*), and Spigelia (*Spigelia anthelmia, Linn.*).

History and Habitat.—The yellow jessamine of the southern United States grows from Virginia southward, extending into Mexico. It flowers in March and April, and some years a second time, at least I am given to understand that such is the case in the State of Georgia. Although its support somewhat regulates the extent of the growth of this climbing vine, still it extends beyond the limits of the support in such a manner as to form beautiful trails and fringes ; this occurs even above trees that are over 50 feet high. The beautiful yellow flowers, the odor of which is said to be narcotic, yield a delightful perfume, which may be extracted by a process similar to that used for procuring oil of rose (Porcher).

The medical history of this plant is quite modern, having been brought into notice, according to Dr. King, by a Mississippi planter, for whom in his illness the root was gathered in mistake for that of another plant ; after partaking of an infusion serious symptoms arose, so alarming in their character that his friends expected his death ; upon his revival, however, it was apparent that the attack of bilious fever from which he had been suffering had disappeared. This accidental cure came to the knowledge of a pretender, who prepared a proprietary nostrum from the plant, called the "Electric Febrifuge." Dr. Porcher, of South Carolina, noting the use of gelsemium in the works of Elliott and Frost, brought it again into notice through the mediumship of a report on the medical botany of his state, made to the Am. Med. Ass'n, in 1849. The first provings were made by Dr. Henry (1852), whose work was followed by many provers, the principal among them being Dr. E. M. Hale, whose "Monograph on Gelsemium" has been a most efficient help to the true knowledge of this valuble American addition to our medicamentæ.

Gelsemium is officinal in the U. S. Ph. as *Extractum Gelsemii* and *Tinctura Gelsemii*, and in the Eclectic Materia Medica as *Tinctura Gelsemini*.

PART USED AND PREPARATION.—Under this rubric it should be borne in mind that "root-gatherers" often mingle with Gelsemium root that of a similar twiner growing in like manner and localities ; this plant is known as *White Jessamine* or *White Poison Vine*. The following comparison will suffice to distinguish them :

Yellow Jessamine.	*White Jessamine.*
Flowers yellow.	*Flowers* dirty-white.
Stem-bark smooth and uniformly gray.	*Stem-bark* maculate and striate with white.
Tendrils wanting.	*Tendrils* present on the lower stem.
Leaves ovate-lanceolate, acute at both extremities.	*Leaves* ovate, taper-pointed, heart-shaped at the base.
Petioles (leaf-stalks) short.	*Petioles* (leaf-stalks) long.
Root fibrous, in section showing a yellowish wood.	*Root* not so fibrous, in section showing white wood.
Taste pleasantly bitter.	*Taste* bitter and nauseous.

PREPARATION.—Small sections of the fresh root, cut from where the whole diameter is not greater than that of a goose-quill,* are to be chopped and weighed.

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* The woody portion of the root contains none of the alkaloid ; this fact was determined by Eberle (1869), and corroborated by Gerrard (1883).

Then two parts by weight of alcohol are taken, the chopped root mixed thoroughly with one-sixth part of it, and the rest of the alcohol added. After having stirred the whole well, allow it to stand in a well-stoppered bottle for at least eight days in a dark, cool place.

The tincture, separated from this mass by filtration, should have a clear, slightly brownish, orange color by transmitted light, an odor like that of an enraged honey bee, a pleasantly bitter taste, and a slightly acid reaction.

CHEMICAL CONSTITUENTS.—Gelsemine,[*] $C_{12} H_{14} NO_2$. This alkaloid, extracted from an alcoholic percolate of the powdered root, was determined by Kollock (1855).[†] Sonnenschein (1876) gave it the formula $C_{11} H_{19} NO_2$, but Gerrard (1883)[‡] judges that the alkaloid used by him must have been impure, as his careful determinations result in the formula given above. Gelsemine, according to Gerrard and others, is a colorless, bitter, odorless, amorphous, brittle, transparent body, without definite crystals, fusing into such mass at a little below 200° C. (392° F.). It is soluble in alcohol, slightly also in boiling water, forms crystalline soluble salts with acids, and gives no color reactions with sulphuric or nitric acids.

Gelsemic Acid.[§]—$C_{30} H_{34} O_{19}$. Sonnenschein (1876) claimed that this body was identical with the glucoside *æsculin*,[||] but Wormley (1882),[¶] after careful chemical and physiological analyses, determines that it is similar to, but not identical with, that body. According to the latter observer gelsemic acid is readily crystallizable into needles, but slightly soluble in water, and soluble in alcohol, ether, and chloroform. Kollock[**] determined, beside gelsemine, a dry and a fatty resin, volatile oil, and a yellow coloring matter.

PHYSIOLOGICAL ACTION.—Many cases of poisoning by the inadvertent use of this drug are reported, from which, together with the experiments of Wormley,[††] we glean the following rationale of its action:

The following symptoms are entailed by doses of from one drachm to an ounce of the fluid extract: Nausea, with ineffectual attempts to vomit; dimness of vision or diplopia, especially on turning the head to one side; congestion of the face; spasms of the larynx and pharynx; restlessness; great prostration; feeble, irregular, and intermittent pulse; irregular and slow respiration with gasping; loss of muscular power, with incoördination; extremities at first hot and dry, then cold and moist; dilated pupils insensible to light; eyes fixed and protruding; inability to raise the eyelids. Death follows without previous loss of consciousness or convulsions.

Post-Mortem.—Venous congestion; collapsed lungs that are otherwise natural; the adipose tissue is found suffused with bile; blood dark, grumous, and enfibrinated; the brain and spinal cord are found pale and anæmic. By this it will be seen that there are no characteristic post-mortem appearances.

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[*] *Gelsemina, gelsemia, gelseminia.*

[†] *Am. Jour. Phar.*, 1855, p. 203.

[‡] A. W. Gerrard, *Am. Jour. Phar.*, 1883, p. 256.

[§] *Gelseminic acid.*

[||] See Æsculus Hippocastanum, 43.

[¶] T. G. Wormley, *Am. Jour. Phar.*, 1882, p. 357.

[**] Ibid.

[††] *Am. Jour. Phar.*, Jan., 1870.

Gelsemium then lowers the rate of the action of the heart and lungs, thus reducing the bodily temperature ; dilates the pupil by paralyzing the motor oculi (differing here from Belladonna, which also dilates the pupil, but does so by irritating terminal filaments from the carotid and cavernous plexuses of the sympathetic system). Its action on the motor oculi causes also a loss of accommodation, and paralysis of the epicylia ; this paralysis is gradually followed by a general paralytic action until the animal becomes impassive, but remains conscious until death. Gelsemium seems to act exactly opposite to Conium, the former destroying all reflex action from the centre to the periphery, the latter from the periphery to the centre. The natural antidote to this drug seems to be black coffee rather than opium ; alcoholic stimulants and heat should also be plied.

DESCRIPTION OF PLATE 130.

1. End of flowering stem, Augusta, Ga.,* May 23d, 1883.
2. A portion of the stem.
3. Calyx and bracts (enlarged).
4. Stamens (enlarged).
5. Pistil (enlarged).
6. Section of the ovary (enlarged).
7. Fruit.

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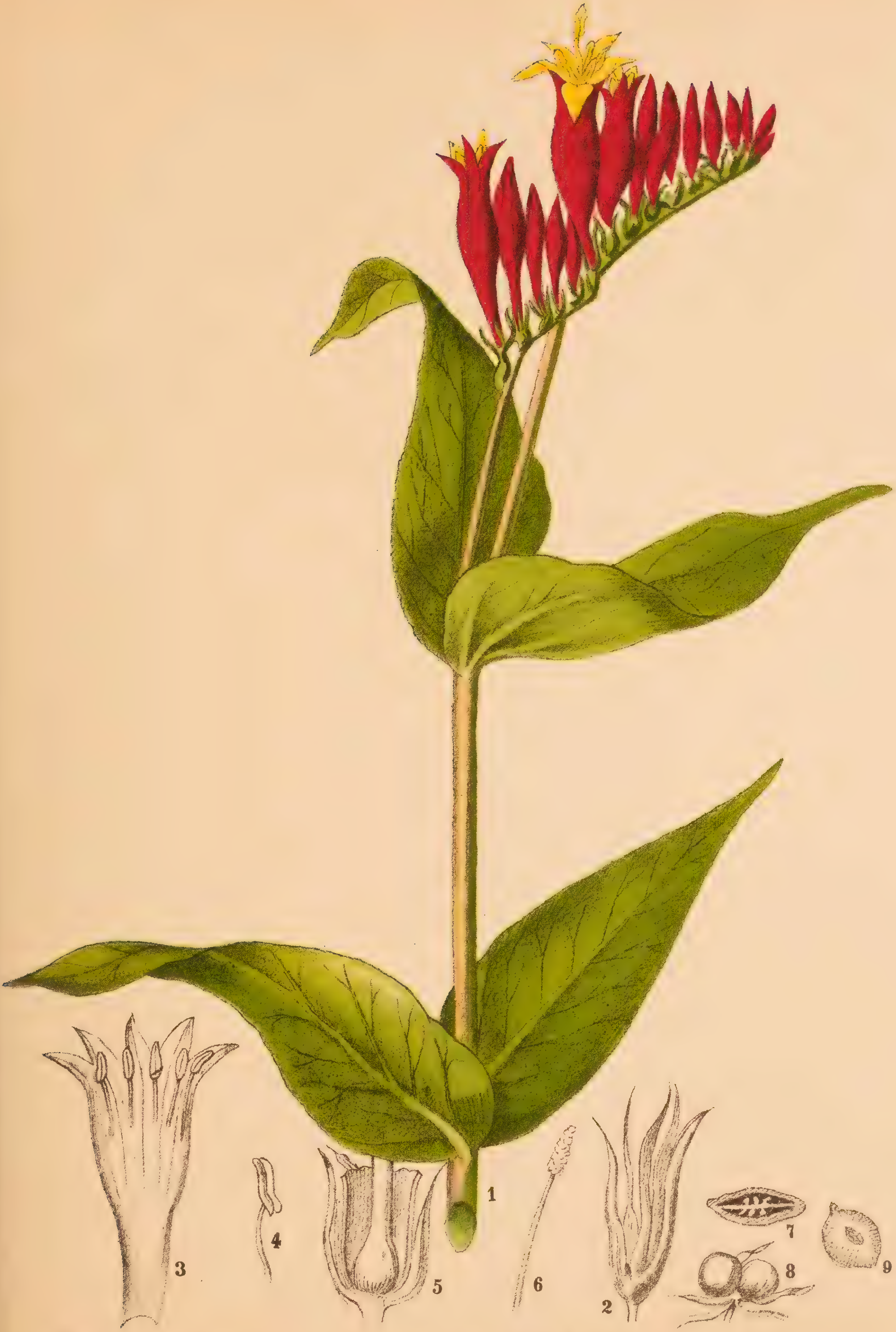
* From one of a number of living specimens, kindly sent me together with the fruit, by Miss Mary C. Cuthbert



C.F.M. ad nat del. et pinxt.

SPIGÈLIA MARILÁNDICA, Linn.

GENUS.—**SPIGELIA**,* LINN.

SEX. SYST.—PENTANDRIA MONOGYNIA.

SPIGELIA MARILANDICA.

PINK ROOT.

SYN.—SPIGELIA MARILANDICA, LINN.; S. OPPOSITIFOLIA, STOKES; S. AMERICANA, MONRO; LONICERA MARILANDICA, LINN.

COM. NAMES.—MARYLAND PINK ROOT, INDIAN PINK, WORM GRASS, PERENNIAL WORM GRASS, SNAKE ROOT, CAROLINA PINK ROOT, STAR BLOOM; (FR.) SPIGÉLIA DE MARYLAND; (GER.) NORDAMERIKANISCHER SPIGELIE.

A TINCTURE OF THE FRESH ROOT OF SPIGELIA MARILANDICA, LINN.

Description.—This Southern perennial herb usually grows to a height of from 1 to 2 feet. *Root* fibrous, twisted; *stems* several from the same root, simple, 4-angled and glabrous. *Leaves* opposite, membranaceous, ovate to ovate-lanceolate, acuminate, closely sessile by a rounded base, entire, one or two pairs of veins basal, the rest more or less pinnate; *stipules* small, interpetiolar. *Inflorescence* in a terminal, sometimes branched, unilateral, scorpioid spike; *flowers* showy, erect; *pedicels* single or geminate; *bracts* minute and subulate, or wanting; *peduncle* short and naked. *Calyx* 5-parted; *lobes* very slender and narrow. *Corolla* scarlet without, yellow within, elongated-tubular, 15-nerved; *tube* somewhat clavate; *lobes* 5, ovate-lanceolate, about one-quarter the length of the tube. *Stamens* 5, inserted above the middle of the corolla-tube; *filaments* short, slightly exserted; *anthers* erect, linear-oblong, 2-celled at the base. *Ovary* superior, smooth, compressed; *ovules* numerous; *placenta* peltate, stipitate; *style* long, the lower portion flattened, the upper cylindrical, the two parts articulated, and the lower persistent, farther exserted than the stamens; *stigma* simply the somewhat inflated hairy end of the style. *Capsule* didymous, compressed contrary to the partitions, circumcissile above the cupule-like base, the two carpels somewhat loculicidally 2-valved. *Seeds* few, peltate, closely packed, and angled by mutual pressure; *embryo* short and straight; *albumen* fleshy.

History and Habitat.—This beautiful plant is indigenous to North America, where it extends from Southern New Jersey to Wisconsin, and southward to Florida and the borders of Texas; it is, however, rare north of central Virginia. It grows in rich soil on the borders of woods, and blossoms from May to July, according to its station.

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* In honor of Adrian Spiegel, the probable originator of *Herbaria*.

Among the Aborigines, even before the discovery of America, this plant was valued as an anthelmintic; the colonists of the South received their information concerning its properties from the Cherokees, who called it *unsteetla*, and from the Osages, who used it also as a sudorific and sedative, under the name of *mikaa*. It was first introduced to the notice of physicians by Dr. Garden, who wrote several letters concerning its properties in 1763-6 to Dr. Hope. Drs. Lining and Chalmers, about this period, also contributed largely to its introduction. These physicians, and many others, have lauded the effects of the root upon lumbricoids, but all agreed that its efficacy was only certain when sufficient fresh root was taken to cause purgation; therefore, if such an effect did not take place, calomel or rhubarb were given to gain such action. This caused many others, who failed with the drug, to demean it, and search for its vaunted effects in the accessory drugs given; Spigelia, however, rose above all protests as an efficient vermifuge. Bergelius found it useful also in convulsions; and Ives and Barton considered it a valuable drug in encephalic forms of fever in children.

The *root* and *Extractum Spigeliæ Fluidum* are officinal in the U. S. Ph.; and in the Eclectic Dispensatory, *Extractum Spigeliæ et Sennæ Fluidum*, and *Infusum Spigeliæ*.

PART USED AND PREPARATION.—The fresh root, gathered just before the flowers expand, is treated as directed under Gelsemium (page 130–2). The resulting tincture has a clear and beautiful reddish-orange color by transmitted light; no characteristic odor; an astringent and slightly bitter taste, and an acid reaction.

CHEMICAL CONSTITUENTS. — Many analyses have been made of this species — none, however, that show the characteristics of the active principle. The following constituents of importance have been determined: An uncrystallizable, bitter substance, having alkaloidal characters, called by some *Spigeline*, an acrid resin, fixed and volatile oils, extractive matter, and a peculiar tannin.[*] The properties of the root seem to be much greater than those of the herb, and also appear to be well extracted by either water or alcohol.

PHYSIOLOGICAL ACTION.—Dr. Barton says[†] Pink Root induces, occasionally, violent narcotic effects, such as dimness of sight, giddiness, dilated pupils, spasmodic motions of the muscles of the eye, and even convulsions. Dr. Chalmers attributes the loss of two children by convulsions to this drug. Dr. Thompson found large doses to produce, in himself, acceleration of the pulse, flushed face, drowsiness, and stiffness of the eyelids.

Bureau[‡] found that the drug acted as an acrid narcotic poison upon rabbits and other animals.

Dr. Hedge Thompson,[§] above referred to, found the following symptoms to be produced upon man, after the ingestion of varying doses, all considered large:

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[*] See *Proc. Am. Phar. Assoc.*, 1857, 132; *Jour. de Phar.*, ix, 197; *Am. Jour. Phar.*, 1857, 511; *Phar. Jour.*, i, v, 354; *Am. Chem. Jour.*, i, 104; and *Am. Jour. Phar.*, 1884, 570.

[†] *Veg. Mat. Med.*, ii, 80.

[‡] *De la famillie des Loganiacees*, 130.

[§] *Exp. diss. on the Spigelia Marilandica*, 1802.

Acceleration of the heart's action, followed soon by a notable reduction and irregularity; nausea; inflammation of the palpebræ, followed by a sensation of stiffness therein; languor, and drowsiness.

Dr. Spalsbury* records the effects of three doses of an infusion as follows: A peculiar, wild, staring expression of the eyes, giving the countenance a very singular, in fact, ludicrous, appearance; strabismus of the right eye; great dilation of the pupils; face, especially about the eyes, including the lids, much swollen; tongue pointed and tremulous; pulse 110 and irregular; on attempting to rise a general tremor came on, which passed off in a few seconds, leaving the patient apparently quite exhausted; and the skin hot and dry. Lining states that the only muscles of the eye affected, according to his experience, were the adductors and abductors.

These symptoms point to the drug as an irritant to the inhibitory nerves, especially the thoracic plexus, and give no farther narcotic symptoms than the natural counter-effect of such irritation.

DESCRIPTION OF PLATE 131.

1. Top of plant in flower, from near Charleston, S. C., June 7th, 1886.
2. Calyx.
3. Opened corolla.
4. Stamen.
5. Section of lower portion of corolla-tube.
6. Style and stigma.
7. Section of ovary.
8. Fruit.
9. Seed.

(2–9 enlarged.)

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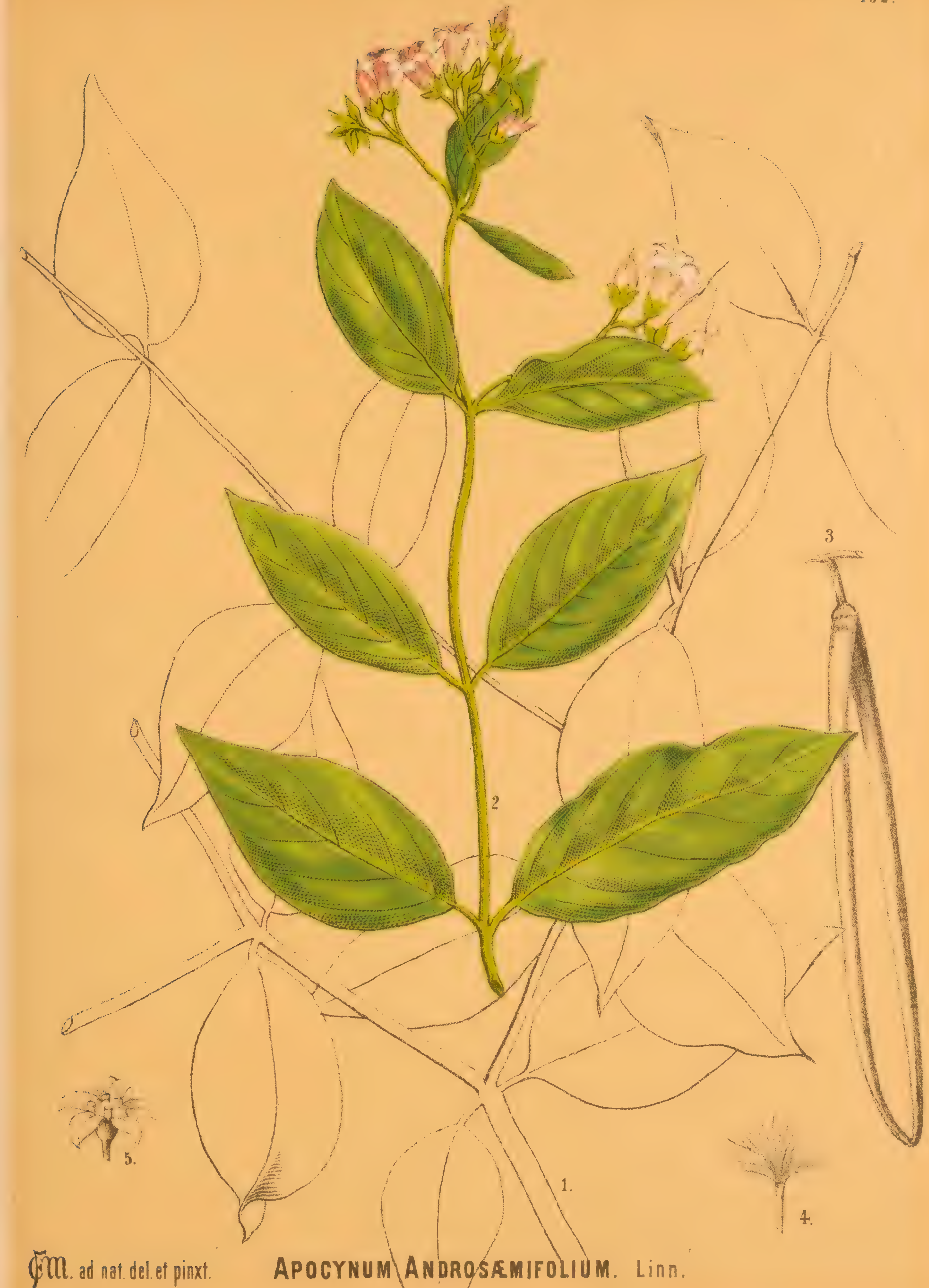
* *Bost. Med. and Surg. Jour.*, lii, 72.



𝔉𝔐. ad nat. del. et pinxt. **APOCYNUM ANDROSÆMIFOLIUM.** Linn.

N. ORD.—APOCYNACEÆ.

GENUS.—**APOCYNUM**,* TOURN.

SEX. SYST.—PENTANDRIA DIGYNIA.

APOCYNUM ANDROSÆMIFOLIUM.

DOG'S BANE.

SYN.—APOCYNUM ANDROSÆMIFOLIUM, LINN.

COM. NAMES.—DOG'S BANE, BITTER ROOT, INDIAN HEMP, MILK WEED, FLY-TRAP, HONEY BLOOM, WANDERING MILK WEED, CATCHFLY, SPREADING DOG'S BANE, AMERICAN IPECAC, BLACK INDIAN HEMP.

TINCTURE OF THE FRESH ROOT OF APOCYNUM ANDROSÆMIFOLIUM, LINN.

Description.—This upright perennial shrub-like herb, grows from 2 to 4 feet in height, branching profusely, and emitting when wounded in any part a milky juice. The *root* is long, more or less cylindrical, with a diameter of from one-eighth to three-quarters of an inch, sparsely branched, and covered with a quantity of fine fibres. It is light-brown externally, wrinkled throughout its length, and transversely fissured; the bark is thin, amorphous, the wood somewhat porous, white and tasteless; the milky juice permeates its whole substance. *Stem* smooth, at first simple, then divergently branched, and forked. *Leaves* opposite, smooth and green above, paler and more or less whitish pubescent beneath; they are ovate, acute, mucronate, from 2 to 3 inches long, and about 1 inch broad. *Petioles* about one-quarter of an inch in length. *Inflorescence* upright or nodding paniculate cymes at the ends of the branches, and in the axils of the terminal leaves. *Pedicels* from 2 to 3 lines long, with minute subulate bracts at their bases. *Calyx* entirely free from the ovaries, five-parted, with ovate-lanceolate, acute lobes, much shorter than the corolla, not glandular. *Corolla* convolute, and sinistrally twisted in the bud, monopetalous, bell-shaped, white tinged with red, five cleft; *limb* spreading; *lobes* ovate, obtuse, reflexed, each bearing at its base a triangular nectariferous scale, free only at the tip. *Stamens* five, inserted at the base of the corolla, alternate with the glands; *filaments* distinct, very short, ligulate, pubescent inside; *anthers* sagittate, with an acute hyaline tip, sometimes slightly coherent, and adhering by their faces to a zone or ring at about the middle of the stigma, 2-celled, the cells opening longitudinally. *Pollen* granular. *Ovaries* 2, oblong, generally distinct, rarely united; *stigma* sessile or nearly so, ovoid, obtuse and obscurely 2-lobed. *Follicles* 2, from 2 to 4 inches long, cylindrical, slender, and pendant; generally remaining united by their apices until fully ripe. *Seeds* numerous, crowned with a long silky coma at their summit. The apocynaceæ are chiefly tropical, acrid, poisonous plants, represented in the gardens by the Oleander and the Periwinkle, and wild in the northern United States by *Amsonia*, *Forsteronia* and *Apocynum*.

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* An ancient name of the dog's bane composed of ἀπὸ, *from*, κύων, *a dog;* as it was thought to be poisonous to this animal.

History and Habitat.—This rather common plant is found from Canada to Georgia, and Missouri. It grows along fences, and over old fields, flowering in June and July, the pods forming well before the blossoms have all fallen.

The names catch-fly and fly-trap are derived from the fact that the flowers of both this and A. cannabinum have a power, without special utility, of imprisoning insects. Dr. Darwin supposed this quality to be due to an irritability of the internal organs, but upon careful observation it is plainly seen that the capture is entirely accidental, the flower and plant remaining neutral. In consequence of the convergence of the anthers and their adherence to the zone of the stigma, a narrow fissure is formed, very contracted at the apex, the insect in search of honey from the nectaries at the base of the corolla, inserts its proboscis between the short filaments of the stamens, thus when about to leave its feast the proboscis is sometimes caught in this fissure; once fast, the greater the insect struggles the more firmly is it wedged, until its self-deliverance becomes impossible. Thus mosquitos, gnats and small flies may frequently be found dead in the flower-tubes.

The only previous use of this herb is said to be that of the Indians, who employed it in syphilis. Rafinesque says: "From its stem may be obtained a thread similar to hemp, which can be woven into cloth; from its pods, cotton; from its blossoms, sugar." The quantity of the last two articles is small, it is true, but might serve in an emergency.

This drug has been dismissed from the U. S. Ph., on account of lack of knowledge of its action. With the Eclectics it is used as *Decoctum Apocyni; Extractum Apocyni Alcoholicum;* and *Apocynin* their so-called alka-resinoid.

For obvious reasons, when desired as a tonic, diaphoretic or laxative agent, a decoction prepared as follows is the most effectual: Take a suitably sized earthen or porcelain-lined vessel and place in it one oz. of the sliced plant, roots, stems and leaves, to which add one pint of pure cold water; place the vessel in a pot of water and let it come to a boil, and remain so for at least an hour, replenishing as fast as it evaporates, with hot water, then strain the decoction from the inner vessel before it cools. It should be covered with a tight lid while heating, and after bottling should be always kept tightly corked; even then it is worthless after standing a few days. Dose, a tablespoonful three times a day.

PART USED AND PREPARATION.—The fresh root is chopped and pounded to a pulp and weighed. Then two parts by weight of alcohol are taken, and after thoroughly mixing the pulp with one-sixth part of it, the rest of the alcohol is added. After having stirred the whole, pour it into a well-stoppered bottle and let it stand eight days in a dark, cool place. The tincture is then separated by decanting, straining and filtering.

Thus prepared, it has a light reddish-brown color by transmitted light, a very bitter taste, and a slight acid reaction to litmus.

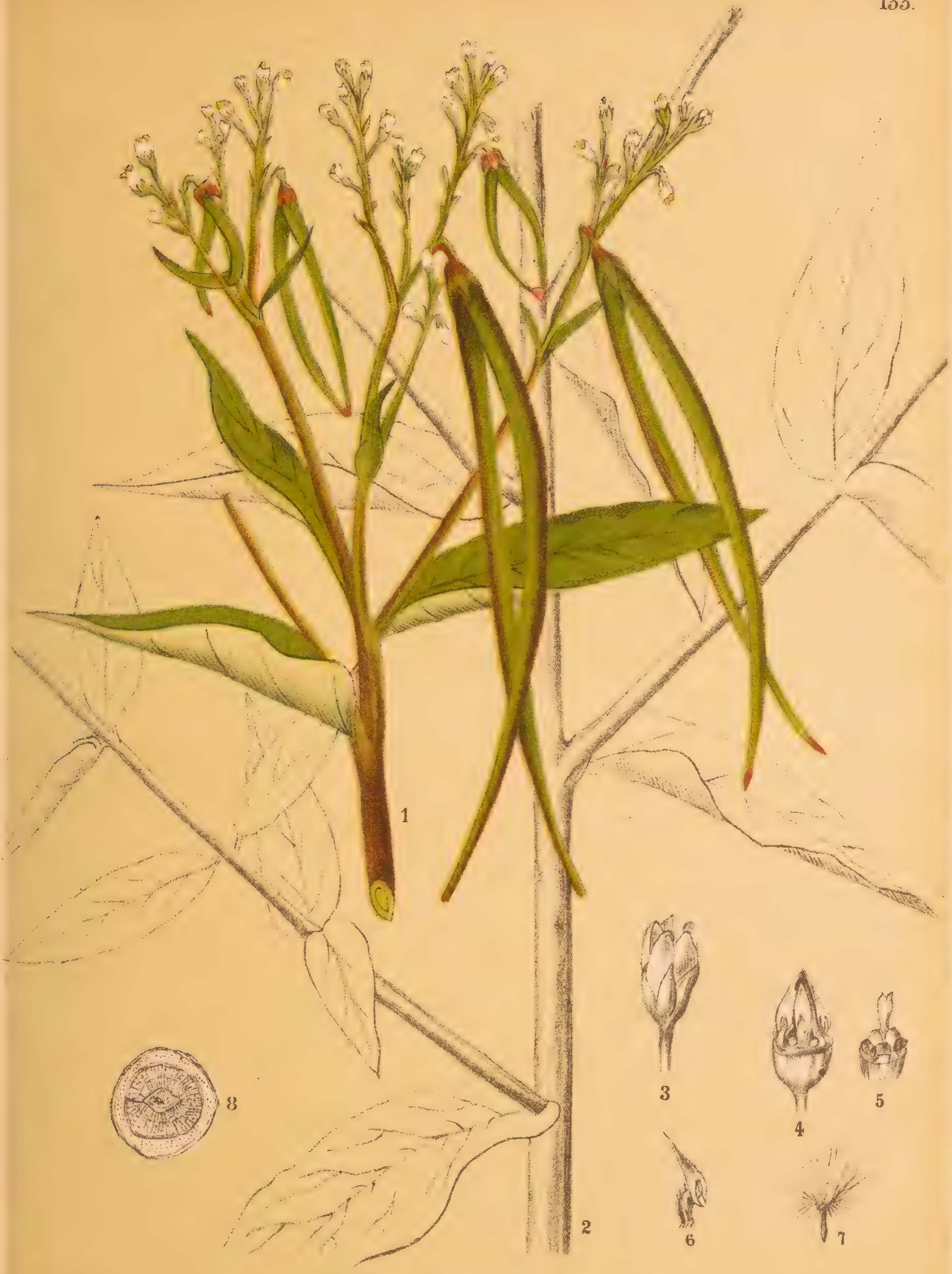
CHEMICAL CONSTITUENTS.—Very little is known of the constitution of this plant, it not having been very thoroughly analyzed. According to Bigelow it contains:

Red coloring matter, soluble in water, slightly soluble in alcohol.
A bitter principle, soluble in water and alcohol.
Volatile oil, caoutchouc and fixed oil.

PHYSIOLOGICAL ACTION.—Here also investigation has been neglected. Apocynum A. is an emetic without causing nausea, a cathartic, and quite a powerful diuretic and sudorific; it is also expectorant and considered antisyphilitic.

Description of Plate 132.

1. Part of plant, from McLean, N. Y., June 15th, 1880, showing the mode of branching.
2. End of branch in flower.
3. Follicles.
4. Seed.
5. Flower (enlarged).



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APÓCYNUM CANNÁBINUM Linn.

GENUS.—**APOCYNUM**, TOURN.

SEX. SYST.—PENTANDRIA DIGYNIA.

APOCYNUM CANNABINUM.

CANADIAN HEMP.

SYN.—APOCYNUM CANNABINUM, LINN.; APOCYNUM HYPERICIFOLIUM, AIT.; APOCYNUM SYBERICUM, JACQ.; APOCYNUM PUBESCENS, R. BR.

COM. NAMES.—AMERICAN INDIAN HEMP,[*] DOG'S BANE,[†] OLD-AMY ROOT, GENERAL MARION'S WEED, SNAKES' MILK, CANADIAN HEMP, AMERICAN HEMP;[‡] (CANADIAN) HOUATTE; (FR.) CHANVRE DU CANADA; (GER.) CANADISCHE HANF.

A TINCTURE OF THE FRESH ROOT OF APOCYNUM CANNABINUM, LINN.

Description.—This species attains a height of from 2 to 4 feet. *Stem* erect, glabrous, or downy pubescent; *branches* upright or ascending, leafy to the top. *Leaves* varying from nearly oval to oblong and sometimes even lanceolate; *base* rounded, obscurely cordate, or acute; *petioles* usually present, short, but sometimes wanting. *Inflorescence* terminal, erect, many and densely flowered, cymes, shorter than the leaves; *flowers* smaller than those of the preceding species. *Calyx: lobes* lanceolate. *Corolla* greenish-white; *tube* not longer than the calyx lobes; *lobes* nearly erect, not reflexed. *Follicles* from 3 to 5 inches long.

In this description only the more distinctive and differential points are given; the generic description is embodied in that of the preceding species. As these two plants are so often classed as one by collectors in general, and as their action is quite different, I append a differentiation:

A. androsæmifolium.	*A cannabinum.*
1. *Stem* divergently branching or bifurcating.	1. *Stem* assurgently branching, not bifurcating.
2. *Root: bark* dark brown; *wood* white, tenacious, fibrous; *pith* of about the diameter of the thickness of the bark, sometimes greater.[§]	2. *Root: bark* grayish-brown; *wood* yellowish, soft, porous; *pith* minute or not evident.[§]
3. *Leaves* ovate, distinctly petioled; those at the bases of the branches like those upon them—*i. e.*, an opposite, petioled pair.[‖] (Plate 132, Fig. 1.)	3. *Leaves* ranging from ovate to nearly lanceolate, sometimes sessile or nearly so; those at the bases of the branches single, sessile, and larger.[‖] (Plate 133, Fig. 2.)
Inflorescence loose, spreading cymes; *flowers* greenish-white, with rose-colored maculations or striæ, or full pale rose-color;[¶] *corolla: tube* longer than the calyx lobes; *lobes* reflexed or spreading.	*Inflorescence* close, erect cymes; *flowers* greenish-white, smaller; *corolla: tube* not longer than the calyx lobes; *lobes* erect.

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[*] This plant is often termed Indian hemp, a name only applicable to *Cannabis Indica*, as it designates that plant alone. American Indian hemp might possibly apply, if we consider the first two words a compound word, and write it American-Indian hemp.

[†] Dog's-bane as properly belongs to *A. androsæmifolium*, as Canadian hemp does to this species.

[‡] American hemp and American Indian hemp (so written) refer to Cannabis Indica as cultivated in America.

[§] Manheimer, in *Am. Jour. Phar.*, 1881, p. 354.

[‖] A purely distinctive point, no mention of which appears in any of the works I have examined.

[¶] The author regrets that a misinterpretation occurred, causing the lithographer to alter his originally rose-colored flowers to green in Fig. 2, Plate 132.

Apocynaceæ.—This family of chiefly tropical plants of poisonous nature, has the following characteristics: Trees, woody shrubs, or herbs, exuding when wounded, a milky, acrid juice. *Leaves* entire, feather-veined, arranged alternately, oppositely, or in whorls; *stipules* wanting. *Inflorescence* terminal or axillary cymes, or panicles; *flowers* 5-merous and 5-androus, perfect and regular. *Calyx* free from the ovary, persistent. *Corolla* gamopetalous; lobes convolute or twisted in the bud. *Stamens* equal in number to the corolla lobes and alternate with them; *anthers* distinct or nearly so, encircling the stigma and sometimes adhering to it, 2-celled, introrsely and longitudinally splitting; *filaments* distinct, inserted upon the tube of the corolla; *pollen* of loose grains, sometimes glutinous. *Ovaries* 2, united or distinct, biplacentiferous; *ovules* numerous or few, anatropous or amphitropous; *style* single, common to both ovaries; *stigma* single, capitate, the receptive surface consisting of a ring encircling the under surface of the stigma. *Carpels* 2, distinct or united; *seeds* numerous, comose or acomose; *albumen* sparse; *embryo* straight and comparatively large.

This family contains in North America 9 genera, 21 species, and 2 varieties. Beside the two under consideration, the following species have a place in the Homœopathic Materia Medica: Dita bark (*Alstonia scholaris*); Oleander (*Nerium oleander*); Tanghinia (*Tanghinia Madagascariensis*, Pet. Th.; *T. venenifera*, Poir; *Cerbera tanghina*, Hook.); the Antillesian Ahovai-baum (*Thevetia nereifolia*, Juss.; *Cerbera thevetia*, Linn.); Toxicophlœa (*Toxicophlœa Thunbergi*); Upas (*Strychnos tieute*); Periwinkle (*Vinca minor*, Linn.); and Echites (*Echites suberecta*, Jacq.).

History and Habitat.—The habitat of both indigenous species is generally given as the same—*i. e.*, sandy soils and the borders of old fields and open woods. I have noticed that *A. androsæmifolium* answers well to this habitat, but that *A. cannabinum* is found much more abundant in marshy places and on the banks of rivers, particularly where they are subjected to submergence during high water. Their geographical range is: from the Canadas southward to Georgia and Florida, and westward to California, A. cannabinum extending the farther south of the two. The two species blossom together in June and July, fruiting as they flower.

This species yields the better and tougher "hemp" of the two, and is more utilized. Porcher quotes* the *Rural Cyc.* as follows:

"This plant has been proved by Prof. Thouin, of Paris, to possess a stronger fibre than that of hemp; and is used by the American Indians for making cordage, fishing-nets, and coarse cloth." He further states: "The decoction affords a permanent dye, brown or black, according to the mordant used."

In general and domestic practice this species has been used and lauded as an excellent diuretic,† also as an hydragogue cathartic, emetic, and diaphoretic, in proper relative dosage.

The root is officinal in the U. S. Ph. In the Eclectic Materia Medica the preparation is: *Tinctura Apocyni.*

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* *Resources of the Southern Fields and Forests*, p. 484.

† See page 132-2, concerning decoction.

PART USED AND PREPARATION.—The preparation is made from the root in the same manner as that of the preceding species. The resulting tincture has a deep reddish-orange color by transmitted light, a rank odor, an extremely bitter and penetrating taste, and an acid reaction.

CHEMICAL CONSTITUENTS.—*Apocynin.* This partly crystalline, bitter principle has been isolated by both Dr. Knapp and Dr. Griscom; its chemical nature has not yet been determined. It is not a glucoside, but for the present is supposed to hold a place in close relation to that class of bodies. It is insoluble, or only slightly soluble, in water.

Apocynëin.—This amorphous glucoside greatly resembles *saponin* in its physical properties.* It is fully soluble in water. Its chemical nature is only slightly known.

Beside the two bitter principles, Dr. Griscom (1832) found in the root, tannic and gallic acids, gum, resin and wax.

PHYSIOLOGICAL ACTION.—Apocynum cannabinum has long been noted for its hydragogue properties, the results obtaining in this direction through its peculiar action upon the mucous membranes of the intestinal canal. What its action may be upon serous membranes is still to be determined. Its action in causing diuresis and diaphoresis (the latter only present when it causes emesis), is another point in the dark, concerning which more light is greatly to be desired. When nausea and vomiting occur, the action of the heart is greatly diminished, and a sense of mental depression and oppression of the chest almost naturally result. Apocynum apparently acts simply as an evacuant, and affects the organic trouble causing the dropsical condition for which it is usually given, little, or not at all.

DESCRIPTION OF PLATE 133.

1. End of fruiting and flowering branch, Binghamton, N. Y., July 22d, 1882.
2. Part of stem, showing mode of branching.
3. Flower (enlarged).
4. Flower after removal of the perianth (enlarged).
5. Flower after removal of the stamens (enlarged).
6. Side view of stamen (enlarged).
7. Seed.
8. Section of the root.

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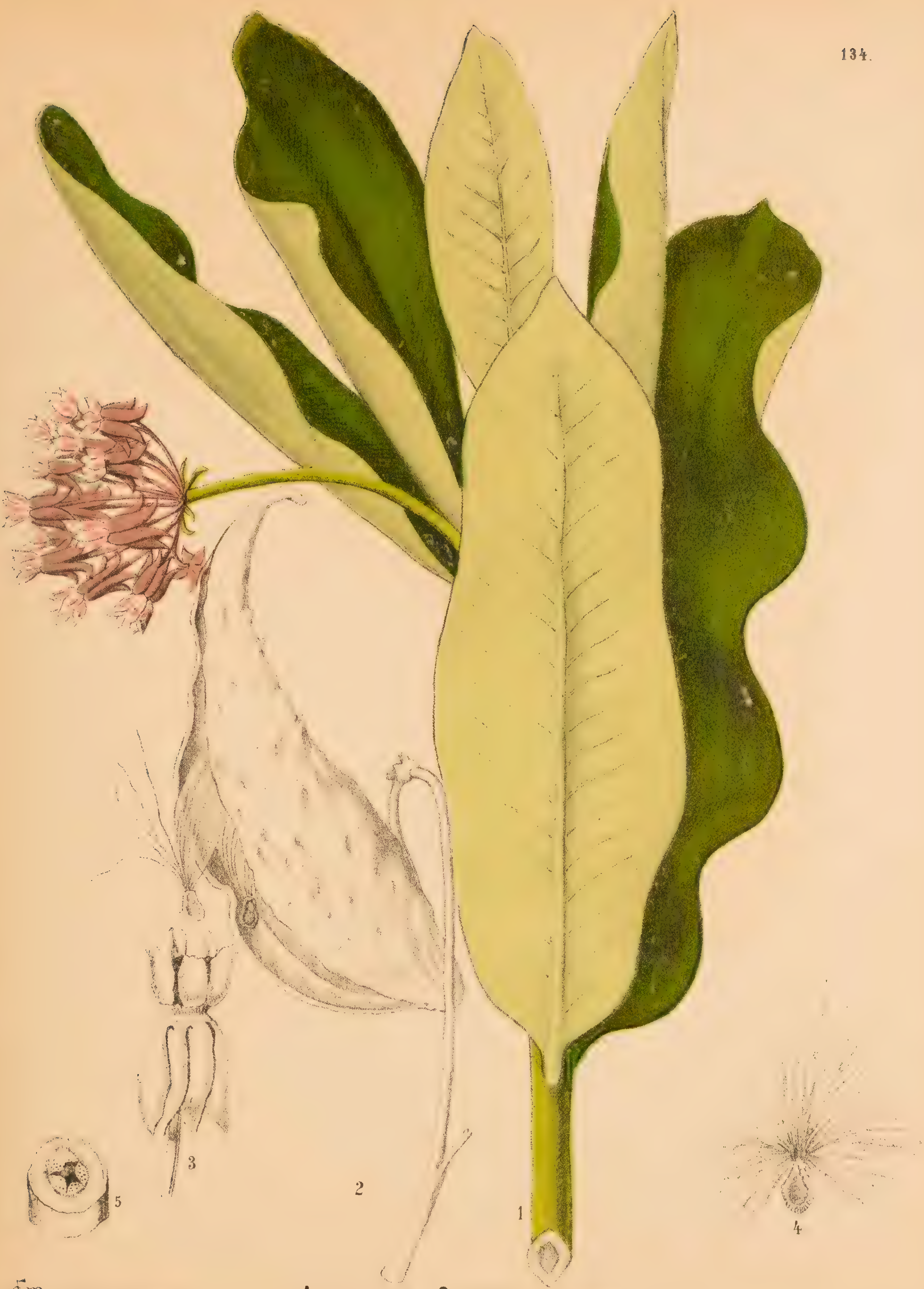
* *Am. Jour. Phar.* 1883, p. 368.



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ASCLEPIAS CORNUTI, Decaisne.

Tribe.—ASCLEPIADEÆ.

GENUS.—**ASCLEPIAS**,[*] L.

SEX. SYST.—PENTANDRIA, DIGYNIA.

ASCLEPIAS CORNUTI.

COMMON MILKWEED.

SYN.—ASCLEPIAS SYRIACA,[†] LINN. A. CORNUTI, DEC.

COM. NAMES.—COMMON MILKWEED, SILKWEED, WILD COTTON, VIRGINIAN SWALLOW-WORT; (FR.), ASCLEPIADE A LA SOIE, HERBE A LA OUATE; (GER.), SCHWALBENWURZEL, SEIDENPFLANZE.

A TINCTURE OF THE FRESH ROOT OF ASCLEPIAS CORNUTI, DEC.

Description.—This stout, upright, perennial herb, grows from 4–5 feet high, is leafy to the top, and bears superior lateral as well as terminal umbels of dusky red flowers.

The *root* extends horizontally to a length of from 1–2 feet, is externally of a grayish-brown color, somewhat branched, and from one-quarter to one inch thick, giving off a few scattered rootlets, or is marked by their scars; it is often knotty from branches that have failed to develop. It has no specific odor, but is decidedly bitter to the taste. It breaks with a short fracture when dry, disclosing a soft, porous, yellow-tinged wood, with broad medullary rays and a thin white bark. The *stem* is simple, or nearly so, cylindrical, stout and smooth, emitting when wounded a copious, white, mucilaginous juice which soon congeals. The *leaves* are about 4–8 inches in length, oppositely arranged upon the stem, oval-oblong, entire, slightly pointed and short petioled; they are of a dark rich green color above, pale and minutely downy beneath. *Inflorescence*, many-flowered umbels, upon long, drooping, downy peduncles, from the base of the petioles of the upper leaves. The *calyx* and *corolla* are deeply 5-parted, reflexed, and spreading, the former persistent, the latter deciduous. The *crown* consists of 5 hooded, fleshy bodies (termed nectaries by Linnæus), situated upon the stamen tube, each containing an incurved horn. Specifically these hoods are ovate, obtuse, having a tooth or lobe upon each side of the horn, which is short and claw-like. *Stamens* 5, inserted upon the base of the corolla; *filaments* united into a tube inclosing the pistil; *anthers* adherent to the stigma (forming a distinguishing feature of this large order of plants, of which Asclepias is the type); they are composed of two vertical cells, tipped with a membrane-like appendage, each containing a flattened, pear-shaped, waxy, pollen-mass. *Ovaries* 2, tapering into two very short *styles*, surmounted at their apices by a large, depressed, 5-angled, fleshy mass, which takes the place of a *stigma* common to the two, having five cloven glands upon its angles. *Pollen*-masses of adjacent anther-cells, extricated by the agency of insects, form pairs, which hang by a fine prolongation of their summits from the glands of the stigmatose body, ejecting copious pollen-tubes into its junction with the styles. *Follicles* 2, one of them often abortive, ovate, soft, woolly, and covered with weak spines. *Seeds* anatropous, margined, flat, furnished with long silky hairs at the hilum; all imbricated downward over the large placenta, which separates from the raphe when mature. *Embryo* large, the thin albumen containing broad leaf-like cotyledons.

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[*] The Greek name of Æsculapius, to whom it is dedicated.

[†] Syria; but as this is a purely American species, we should use the name by Decaisne.

History and Habitat.—This very common herb grows in rich or sandy ground, along roadsides and in waste places everywhere in Canada and the United States, flowering during the summer months. Few genera are more beautiful or complex in their structure than this, still the plants of this order are so peculiar that even the youngest student of botany will recognize them at a glance. That they are so plentiful cannot appear strange after an examination of the seeds, whose silky coma when expanded forms them into veritable parachutes; balanced by the pendant seeds, they mount gracefully to immense heights, whence they are wafted far and wide by the lightest zephyr until, dampened by dew or rain, they fall to the ground. The young sprouts, just as they appear above the ground in spring, are highly esteemed among housewives as a pot-herb, being cooked similarly to asparagus, for which they are an excellent substitute. The juice when applied to the skin forms a tough, adhesive pellicle; this has led to its use by the laity as a covering for ulcers and recent wounds to promote cicatrization. In a memoir on the cultivation of this plant, by J. A. Moller, in Tilloch's Magazine, vol. viii, p. 149, may be found the following: "Its chief uses were for beds, cloth, "hats, and paper. It was found that from eight to nine pounds of the coma of the "seeds occupied a space of from five to six cubic feet, and were sufficient for a bed, "coverlet, and pillows. The shortness of the fibre prevented it from being spun "and woven alone, it however was mixed with flax, wool, etc., in certain stuffs to "advantage. Hats made with it were very light and soft. The stalks afforded "paper in every respect resembling that obtained from rags. The plant is easily "propagated by seeds or slips. A plantation containing thirty thousand plants "yielded from six to eight hundred pounds of coma."

This plant, together with many other excellent drugs, has been dismissed *sine curâ* from the U. S. Ph. The Eclectic Dispensatory recommends its use in a fluid extract, dose from 10 drops to a fluidrachm; in amenorrhœa, dropsy, retention of urine, asthma, dyspepsia, cough, dyspnœa, etc.

The use of the Asclepiadeæ in general in pleurisy is not well proven, though their action upon the nerves might lead to empirical use in pleurodynia.

PART USED AND PREPARATION.—The fresh root, already described, is gathered when in full vigor, chopped and pounded to a pulp and weighed. Then two parts by weight of alcohol are taken, and after thoroughly mixing this pulp with one-sixth part of it, the rest of the alcohol is added. After having stirred the whole, pour it into a well-stoppered bottle and let it stand eight days in a dark cool place. The tincture is then separated by decanting, straining, and filtering.

Thus prepared it has a light orange-yellow color by transmitted light, a bitter and slightly astringent taste, quite similar to half ripe butternuts, and a slightly acid reaction.

CHEMICAL CONSTITUENTS.—Asclepione,* $C_{20}H_{34}O_3$. This resinoid principle was determined by List in the juice of the plant; also by W. L. Hinchman (Am. Jour. Phar. 1881, p. 433) in the roots; as white, verrucose, odorless, tasteless, iridescent crystals; decomposing at 194° (219.2° F.) and volatilizing at higher temperatures. They are soluble in chloroform, ether and alcohol; insoluble in water. The roots, according to the latter authority, contain *asclepione*, *caoutchouc*, *fixed oil*, *tannin*, *glucose*, a *bitter principle* not isolated, *gum*, *starch*, and *volatile oil*. The milky juice of the whole plant contains the same bodies found in the root. The acid of the plant seems to be in close relation with the undetermined bitter principle.

PHYSIOLOGICAL ACTION.—A. cornuti is diuretic (increasing the solid constituents as well as the watery portion of the urine) and diaphoretic, not by stimulating but by lowering the action of the heart. It is thought to act directly upon the vaso-motor system, often in this sphere lessening local congestions. Its minute action can best be studied in the published provings. Anodyne properties have been attributed to this drug, but this is totally unsupported at present.

DESCRIPTION OF PLATE 134.

1. Upper part of plant, from Binghams, N. Y., June 21st, 1880.
2. A cluster of follicles.
3. A flower (enlarged).
4. Seed (somewhat enlarged).

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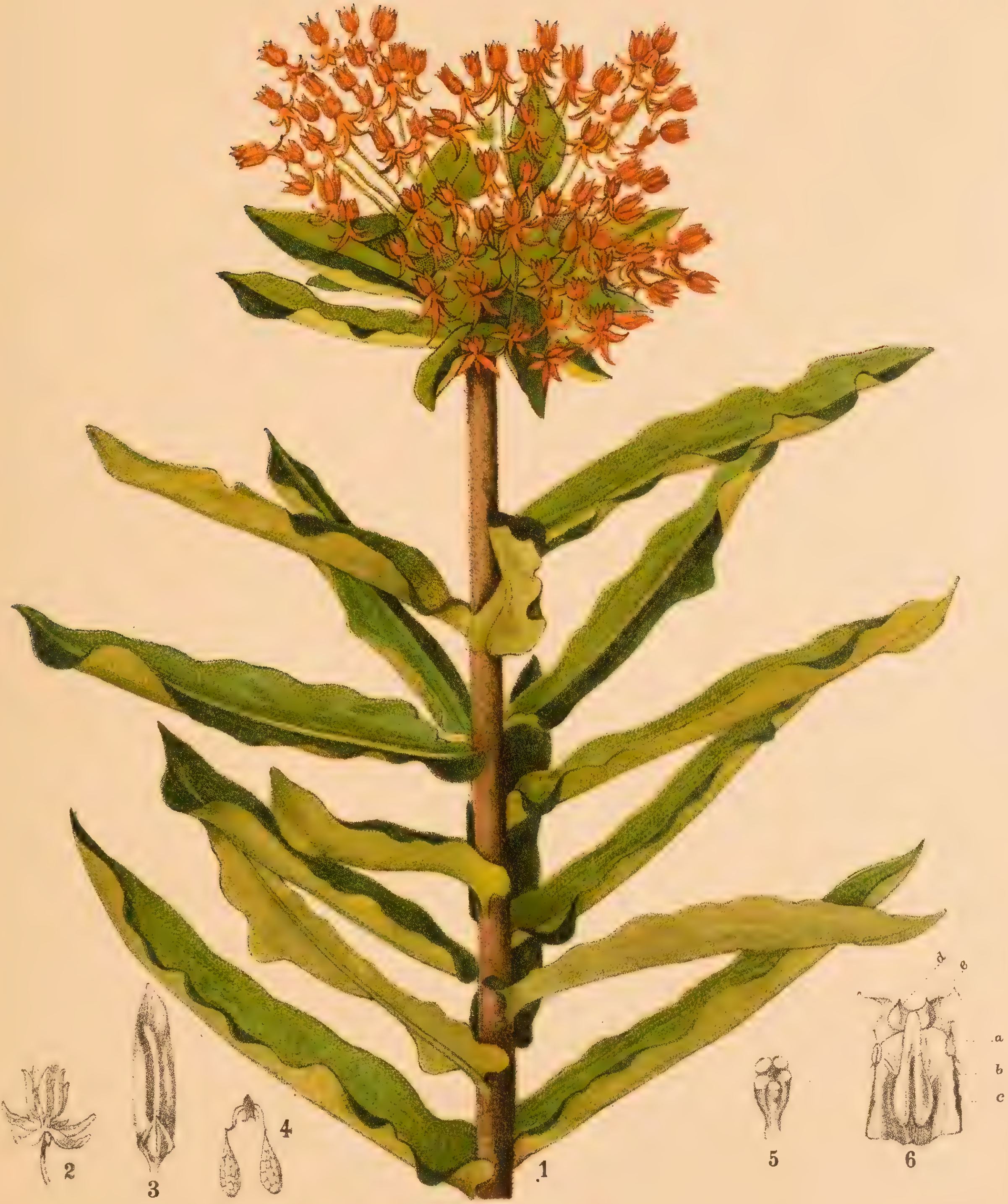
* There seems to be a similarity between this body and Lactucerin, *vide*, 96.



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ASCLÈPIAS TUBERÒSA, Linn.

Tribe.—ASCLEPIADEÆ.

GENUS.—**ASCLEPIAS**, LINN.

SEX. SYST.—PENTANDRIA DIGYNIA.

ASCLEPIAS TUBEROSA.*

PLEURISY-ROOT.

SYN.—ASCLEPIAS TUBEROSA, LINN.; ASCLEPIAS CAULE ERECT. DIVAR. VILLOS., ETC., HORT. CLIFF.; APOCYNUM NOVÆ ANG. HIRSUT. ETC., HERM. LUGDB.

COM. NAMES.—PLEURISY-ROOT, BUTTERFLY WEED, ORANGE SWALLOW-WORT, ORANGE MILK-WEED, ORANGE APOCYNUM, WIND ROOT, WIND WEED, COLIC ROOT, WHITE ROOT; (FR.) ASCLEPIADE TUBEREUSE; (GER.) KNOLLIGE SCHWALBENWURZ.

A TINCTURE OF THE FRESH ROOT OF ASCLEPIAS TUBEROSA, LINN.

Description.—This attractive plant grows to a height of from 1 to 2 feet. *Root* large, sarcous, fusiform and branching. *Stems* numerous, erect or oblique, roughish hairy, branching superiorly, and leafy to the top; they form an exception to Asclepiadeæ in general by being almost or entirely devoid of milky juice. *Leaves* numerous, scattered, some falling opposite; they may vary from linear to linear- or oblong-lanceolate, be sessile or very short petioled, hirsute, mostly acute or subacute, and undulately wrinkled along the margin. *Inflorescence* terminal cymose or corymbose clusters of short peduncled umbels; *flowers* showy, greenish- or orange-chrome. *Calyx* much smaller than the corolla; *sepals* reflexed, subulate, hidden under the lobes of the corolla. *Petals* or divisions of the corolla oblong, at first extended then reflexed. *Crown* elevated conspicuously above the base of the corolla; *hoods* or *cuculli* erect, narrowly oblong, sessile, somewhat broadened at the base, and about twice the length of the column; *horns* subulate, slender, nearly erect. *Column* short. *Anthers* shorter than the cuculli; *wings* truncate, broadest at the base. *Pods* lanceolate, acuminate, hoary.

Asclepiadaceæ.—This large family differs mainly from the preceding, and all Exogens, in the arrangement of the essential organs and fecundating element. It consists of shrubs and herbs having acrid, bitter, milky (exc. *Asclepias tuberosa*) juice, containing *caoutchouc*. It answers in general to the characters of leaf, flower, and fruit exhibited in the Apocynaceæ (*vide ante, p. 133–2*).

Leaves destitute of stipules; their place generally supplied by hairs. *Inflorescence* terminal, axillary or somewhat racemose clusters of cymose or umbelliform flowers; *bracts* minute. *Corona*[*] consisting of 5 parts or lobes (hoods), usually present and situated between the corolla and the stamens, adnate to the one or the other. *Disk* (hypogynous) wanting; *stamens* mostly monadelphous, their tube forming the *column; anthers* introrse, 2- or incompletely 4-celled, in Asclepias flattened, opening lengthwise (c. Fig. 6), and surmounted by a small membranous appendage (d. Fig. 6). *Styles* 2, generally distinct as far as the stigmatic body; *stigma* or *stigmatose disk* fleshy, consisting of a central portion or body common to both styles, from which are produced 5 corpuscles or glands, alternate with the anthers (e. Fig. 6). *Pollinia* (Fig. 4) waxy masses of coherent, granular, compressed hexagonal, pollen cells. Each of the masses is furnished with a fine prolongation, these meet in pairs, the point of juncture being tipped with a minute, black, coriaceous appendage, sharply cleft at its inferior edge, the sides prolonging like the barbs of an arrowhead; this appendage is situated between the apices of two contiguous anthers, and is connected with the stigmatic glands. Thus when the pollen is withdrawn two anthers yield a cell's contents each to the mass. *Fruit* a pair of follicles except when aborted; *seeds* few or many, compressed, imbricate, generally margined, and furnished with a soft coma; *embryo* straight; *cotyledons* foliaceous; *albumen* thin. A general description of Asclepias is incorporated in that of A. cornutum, 134.

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* In executing this plate with the stem and leaves natural size, it became necessary to remove two flower clusters, which greatly diminishes its value to the botanist, though the representation is still characteristic of *A. tuberosa*.

A word in regard to cross-fertilization in Asclepias. While drawing figure 2, plate 135, holding the flower by its peduncle, a large blue-bottle fly alighted upon the crown, as he did so one of his legs slipped down between two hoods,—which neatly curve to such a shape that the foot of an insect is guided directly into the crevice between two adjacent anther cells—and upon attempting to withdraw it he was unable to do so. Noting this, I teased him into many strong tugs and pulls, but the more he struggled the tighter his foot became wedged, until finally after about ten minutes' hard work he flew off with a little yellow spot attached to the extremity. I caught him, plucked off the leg, and examined it under a lens; the claws were firmly wedged into the little cleft, before mentioned as existing in the coriaceous appendage of the pollen-masses. I afterward examined numerous heads of *Asclepias cornuti*, nearly always finding many captive insects, especially *Muscæ*, some dead and others struggling; and watched many more fly off with the fecundating element trailing after them. Others, too, arrived with pollen-masses, and by the same interesting procedure as described, left their burdens in the crown, thus executing without design the will of Nature.

The plants of this order that are of particular interest to us, beside the two under consideration, are: Cundurango (*Gonolobus Cundurango*), the Spanish *Mataperro* (the plant that—being announced and lauded as a cure for cancer—caused such a furor in medical and general circles in 1871; now considered worthless in cancer or any other disorder by those who were foremost in its advancement and use); and the curled-flowered Calatropis (*Calatropis gigantea*), a native of the East Indies. The other prominent medicines in this order are: The Indian emetic *Secamone emetica*, and purgative *S. Thunbergii*. The acrid juice of Syrian Periploca (*Periploca Graeca*) has been used as a stimulating application for ulcers, and in Greece as a wolf poison. Lindley states* that the East Indian *Tylophora asthmatica* is either emetic or purgative in the proper dosage, and constitutes a valuable Indian remedy. Many species of *Gonolobus* act as drastic purges, and some are used by the Aborigines as arrow poisons. The Ceylon Indian or Country Sarsaparilla, *Hemidesmus Indicus,* is spoken of by Lindley† as being quite as efficient in its usage as the American root, and adds: "A great deal of it is consumed in London and considered a fine sort." The genus *Cynanchum* affords several purgatives, one of which, the Syrian *Cynanchum erectum* (*Marsdenia erecta*), is stated to be very poisonous, and used by the natives as a means of murder or suicide; *Arghel* (*Cynanchum Argel*) is often used to adulterate Alexandrian Senna, and to this Lindley ascribes the griping and other unpleasant effects of the commercial Senna; while the leaves of the East Indian *Cynanchum extensum* (*Daemia extensa*) are employed as an anthelmintic, and the juice in asthma. Thus throughout the order almost all species are used in the practice of their native countries; while to the arts some yield excellent fiber for the manufacture of rope, and others (especially *Cynanchum ovalifolium*), caoutchouc in good quantity and of fine quality.

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[*] Crown, nectary, lepanthium.

History and Habitat.—Asclepias tuberosa is common from Canada southward; growing at first near the coast on sandy fields, but spreading inland as the soil grows drier and less rich. It flowers northward during the earlier months of summer, and fruits in September. The procumbent form, more common southward, formerly classed with this species, is now recognized as *var. decumbens*, Pursh. The Western Indians boil the tubers for food; prepare a crude sugar from the flowers, and eat the young seed-pods after boiling them with buffalo meat. Some of the Canadian tribes use the young shoots as a pot-herb after the manner of asparagus.‡

The pleurisy-root has received more attention as a medicine than any other species of this genus, having been regarded, almost since the discovery of this country, as subtonic, diaphoretic, alterative, expectorant, diuretic, laxative, escharotic, carminative, anti-spasmodic, anti-pleuritic, stomachic, astringent, anti-rheumatic, anti-syphilitic, and what not? It has been recommended in low typhoid states, pneumonia, catarrh, bronchitis, pleurisy, dyspepsia, indigestion, dysentery, helminthiasis, and obstinate eczemas, in doses of from 20 to 40 grains of the powdered root.

Schoepf first brought it before the medical profession, followed by Drs. Barton, Chapman, Eberle, and Parker, each of whom found it often reliable, especially in cases where an expectorant or diaphoretic seemed requisite. In colic and rheumatic pains its exhibition met with much success. Dr. Chapman states§ that it is distinguished by great certainty and permanency of operation, and is well suited to excite perspiration, etc. Prof. Barton esteemed it as one of the most important of our indigenous remedies. Dr. Benj. Parker says:|| "The powdered root frequently acts as a mild purgative, but it is particularly valuable for its virtues as an

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* *Flor. med.*, p. 542.

† *Idem*, p. 544.

‡ J. R. Dodge in *U. S. Agric. Rep.*, 1870, p. 405.

§ *Elementary Therapeutics*, Vol. 1, p. 351.

|| *Thatcher Disp.* in *Barton's Veg. Mat. Med.*, Vol. 1, p. 247.

expectorant, diaphoretic, and febrifuge." "From the successful employment of the pleurisy-root for twenty-five years, he has imbibed such confidence that he extols it as possessing the peculiar and almost specific quality of acting on the organs of respiration, powerfully promoting suppressed expectoration, and thereby relieving the breathing of pleuritic patients in the most advanced stage of the disease; and in pneumonic fevers, recent colds, catarrhs, and diseases of the breast in general, this remedy has in his hands proved equally efficacious." Dr. Griffith concludes[*] that "from all that can be gathered on the subject, it may be deemed one of the most useful of our native articles, and deserves a full and unbiassed trial." Other and more recent writers as usual have looked with doubt upon all its given qualities, except mayhap its utility as an expectorant and diaphoretic. The provings, however, point to it as a valuable remedy in certain forms of dry coryza, indigestion, colic, diarrhœa, dry coughs, pleurisy, general rheumatic pains, and certain skin affections. In one case only in my own practice have I seen the indications for its use, that a case of chronic indigestion, accompanied by dry cough and intercostal rheumatic pains; it acted promptly and efficaciously, bringing relief within a few hours, and immunity of the disorder within a month.

The root is officinal in the U. S. Ph. Its preparations in the Eclectic Materia Medica are: *Extractum Asclepidis Alcoholicum*, and *Fluidum; Infusum Asclepidis; Pulvis Asclepiæ Compositus*;[†] *Pulvis Ipecacuanhæ Compositus*;[‡] *Tinctura Lobeliæ Composita*;[§] and *Asclepidin* or *Oleo-Resina Asclepidis*.

PART USED AND PREPARATION.—The tincture is prepared from the fresh root in the same manner as that of the preceding species. It has a brownish-orange color by transmitted light, darker therefore than that of *A. cornuti*; a slightly bitter taste; preserves the characteristic odor of the root, and has a decided acid reaction.

CHEMICAL CONSTITUENTS.—An analysis of the root by Alton Clabaugh[||] resulted in the separation of a fixed oil saponifiable by caustic alkalies; a peculiar odorous, crystalline, sublimable stearopten melting at 160° F., and soluble in alcohol, ether, and chloroform; a bitter principle insoluble in alcohol; another yellowish-brown bitter principle soluble in alcohol; a yellowish-white body possessing the taste of the drug, soluble in alcohol; together with starch, gummy and coloring matters, and a resin, thus corroborating the former analysis of Elam Rhodes.

PHYSIOLOGICAL ACTION.—The following symptoms occurring after taking doses of from 20 to 50 drops of the tincture, are recorded by Thos. Nichol.[¶] Deficient appetite, with pain and weight in the pit of the stomach; soreness and colic, followed by flatulence; soft fœtid stools, preceded by rumbling in the bowels; dry, hard, hacking cough, with painful respiration; sharp, shooting pains, especially between the ribs and about the heart, aggravated by deep inspiration and by motion of the arms; darting, shooting pains in the extremities, followed by a sense of languor and debility.

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[*] *Med. Bot.*, p. 455.

[†] Pleurisy-root, Spearmint, Sumach Berries, Bayberry Bark, Skunk Cabbage, and Ginger.

[‡] Pleurisy-root, Ipecacuanha, Blood Root, and Nitrate of Potassa.

[§] See foot-note to Lobelia inflata, 99.

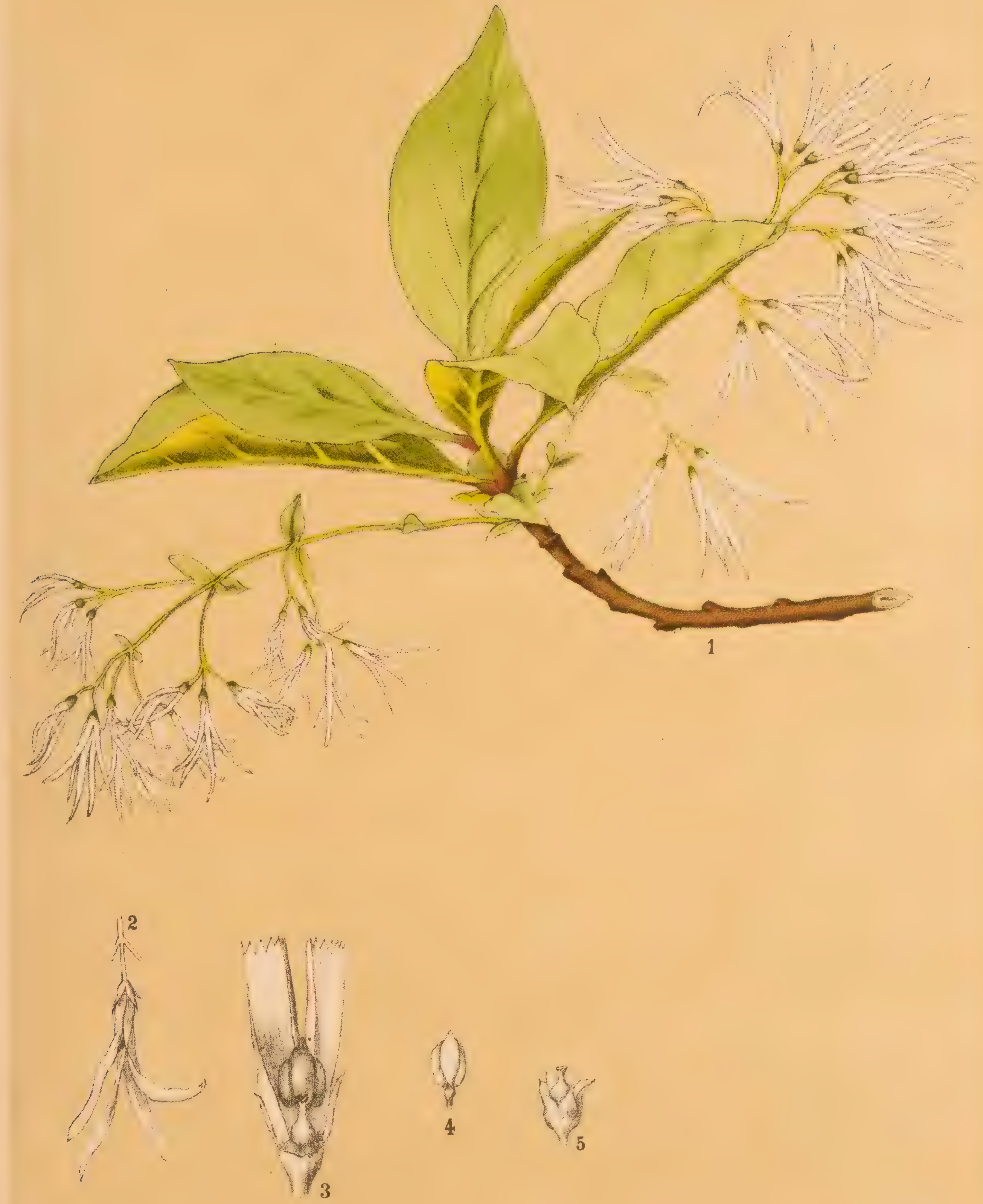
[||] *Am. Jour. Phar.*, 1882, p. 5.

[¶] Hale, *New Remedies*, 2d Ed.

From this it is evident that *A. tuberosa* has a decided action upon the body, especially the mucous membranes of the alimentary tract. Just what this action is, is as yet undeterminable.

DESCRIPTION OF PLATE 135.

1. End of flowering plant with two clusters removed, Jamaica, L. I., July 17th, 1884.
2. Flower, somewhat enlarged.
3. Hood and horn (enlarged).
4. Pollen-masses, showing connective (x 25).
5. Stigmatic body (enlarged).
6. A portion of the column, showing:
   - *a.* The connective of the pollen-masses.
   - *b.* Cleft between the anther cells.
   - *c.* Anther.
   - *d.* Membranous appendage.
   - *e.* Stigmatic lobe.



C.F.M. ad nat del. et pinxt.

CHIONÁNTHUS VIRGÌNICA, Linn.

N. ORD.—OLEACEÆ.
Tribe.—OLEINEÆ.
GENUS.—**CHIONANTHUS,**[*] LINN.
SEX. SYST.—DECANDRIA MONOGYNIA.

CHIONANTHUS.

FRINGE TREE.

SYN.—CHIONANTHUS VIRGINICA, LINN.
COM. NAMES.—FRINGE TREE, SNOW FLOWER, POISON ASH, OLD MAN'S BEARD, SNOWDROP TREE; (FR.) CHIONANTHE; (GER.) SCHNEEBAUM, ODER SCHNEEBLUME.

A TINCTURE OF THE FRESH BARK OF CHIONANTHUS VIRGINICA, LINN.

Description.—This beautiful southern shrub grows to a height of from 6 to 10 feet, and may be characterized as follows: *Leaves* smooth or downy-pubescent, oblong- or ovate-lanceolate, and narrowed into a petiole; *margin* entire. *Inflorescence* loose, axillary, leafy-bracted panicles, appearing with the leaves, than which they are longer; *flowers* delicate, more or less arranged in threes, each on a drooping pedicel. *Calyx* small, 4-cleft, persistent; *lobes* linear-lanceolate. *Corolla* wheel-shaped, 4-cleft; *lobes* long, linear, and almost separate. *Stamens* 2, included, inserted just at the base of the corolla; *anthers* larger than the young pistil, 2-celled; *filaments* no longer than the anthers. *Style* short; *stigma* 4-notched. *Fruit* an ovoid, blackish, fleshy drupe, covered by a delicate bloom; *seeds* 1 to 3.

Oleaceæ.—A small family of trees or shrubs, represented in North America by 6 genera, 29 species, and 7 varieties. *Leaves* opposite, simple or pinnate, extipulate, deciduous. *Flowers* perfect, polygamous or diœcious. *Calyx* 4-toothed, sometimes obsolete. *Corolla* 4-lobed or petaled, sometimes wanting; *æstivation* valvate. *Stamens* 2 or abnormally more. *Ovary* 2-celled, with 2 suspended ovules in each cell; *style* single or none. *Fruit* a 1–2 seeded samara, berry, or drupe. *Embryo* straight; *albumen* hard, sometimes wanting.

The only proven plant in this order, beside those here considered, is the White Jessamine (*Jasminum officinale*, Linn.), the authority for the use of which I am unable to determine. Prominent in this order stands the Levantine and South European Olive (*Olea Europæa*, Linn.), which yields, beside its valuable fruit and oil, a bark that is highly spoken of by De Candolle as a substitute for

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[*] *χιών*, *chion*, snow; ἄνθος, *anthos*, flower.

Cinchona, and a gummy substance much esteemed as a vulnerary. The South European Flowering Ash (*Fraxinus Ornus*, Linn.) exudes from its branches a dulcamarous substance called *Manna*, a gentle laxative, useful in cases of genito-urinary affections attended by constipation; it has, however, the usual drawback of causing flatulent colic.[*] Calabrian manna, considered by Fothergill to be of even better quality than the last, is a product of *F. excelsior*, Linn.; *F. rotundifolia* is also manniferous. The fruit of the Persian Lilac (*Syringia vulgaris*, Linn.[†]) is, according to Curveiller, a remarkably good tonic and febrifuge when extracted.

The leaves of the South European *Phyllyrea latifolia* have been found to relieve headache, when soaked in vinegar and applied with a compress; the leaves of the British Privet (*Ligustrum vulgare*) are often used in the same manner; both are astringents.

History and Habitat.—The Fringe Tree is indigenous to the United States, where it ranges from the southern portions of Pennsylvania southward to Florida and Texas. It habits rich woods along the borders of streams, flowering in June.

The previous use of the bark of this shrub as an astringent vulnerary, and the bark of the root as a tonic after long and exhaustive diseases, is one that has a great merit. The bark in infusion is a remedy that was too often neglected for foreign drugs in the treatment of typhoid forms of fever and intermittents, especially those of bilious character. This bark has often also proved itself a trustworthy diuretic, and Prof. Griffith deems it possessed of acro-narcotic properties. Rafinesque claims that the root makes a cataplasm that will cause the healing of wounds without suppuration. Dr. F. S. Smith, of Lock Haven, Pa., who has used the fluid extract of the bark in his practice, judges it one of the best remedies at his command in certain forms of bilious sick headaches; and Dr. E. M. Hale is of the opinion that in all the diseases mentioned above Chionanthus will often prove to be the similimum.

PART USED AND PREPARATION.—The fresh bark, including that of the root, is chopped and pounded to a pulp and weighed. Then two parts by weight of alcohol are taken, the pulp thoroughly mixed with one-sixth part of it, and the rest of the alcohol added. The whole is then poured into a well-stoppered bottle, and allowed to stand eight days in a dark, cool place.

The tincture, separated from this mass by pressure and filtration, has a beautiful, slightly orange-red color by transmitted light, a bitterish barky odor, a bitter taste, and an acid reaction.

PHYSIOLOGICAL ACTION.—According to Drs. Lawsche and Scudder, the symptoms following the ingestion of this drug are substantially as follows: Severe frontal headache, bruised, sore sensation in the eyeballs; nausea, bitter eructations and retching, followed by pressure to stool; tongue coated greenish-yellow; uneasy sensations throughout the alimentary tract; vomiting of ropy, bitter, dark-green, bilious matter; blackish evacuations of the bowels; slow pulse; cold perspiration, and great general weakness.*

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[*] Armenian manna is derived from *Quercus Persica*, J. & S., and *Quercus vallonea*, Kat (Cupuliferæ); Australian manna, from *Eucalyptus viminalis*, Lab. (Myrtaceæ); Tamarisk manna, *Tamarix gallica*, Linn. (Tamiricaceæ); Persian manna, from *Alhagi camelorum*, Fisch. (Leguminosæ); and Briançon manna, from *Pinus Larix*, Linn. (Coniferæ).

[†] Our common purple Lilac is *var. violacca*, and the white, *var. alba*, both natives of Persia.

DESCRIPTION OF PLATE 136.

1. End of a flowering branch, Landisville, N. J., June 7th, 1885.
2. A flower.
3. A flower with broken petals, showing essential organs.
4. Stamen.
5. Pistil and calyx.

(2–5 enlarged.)

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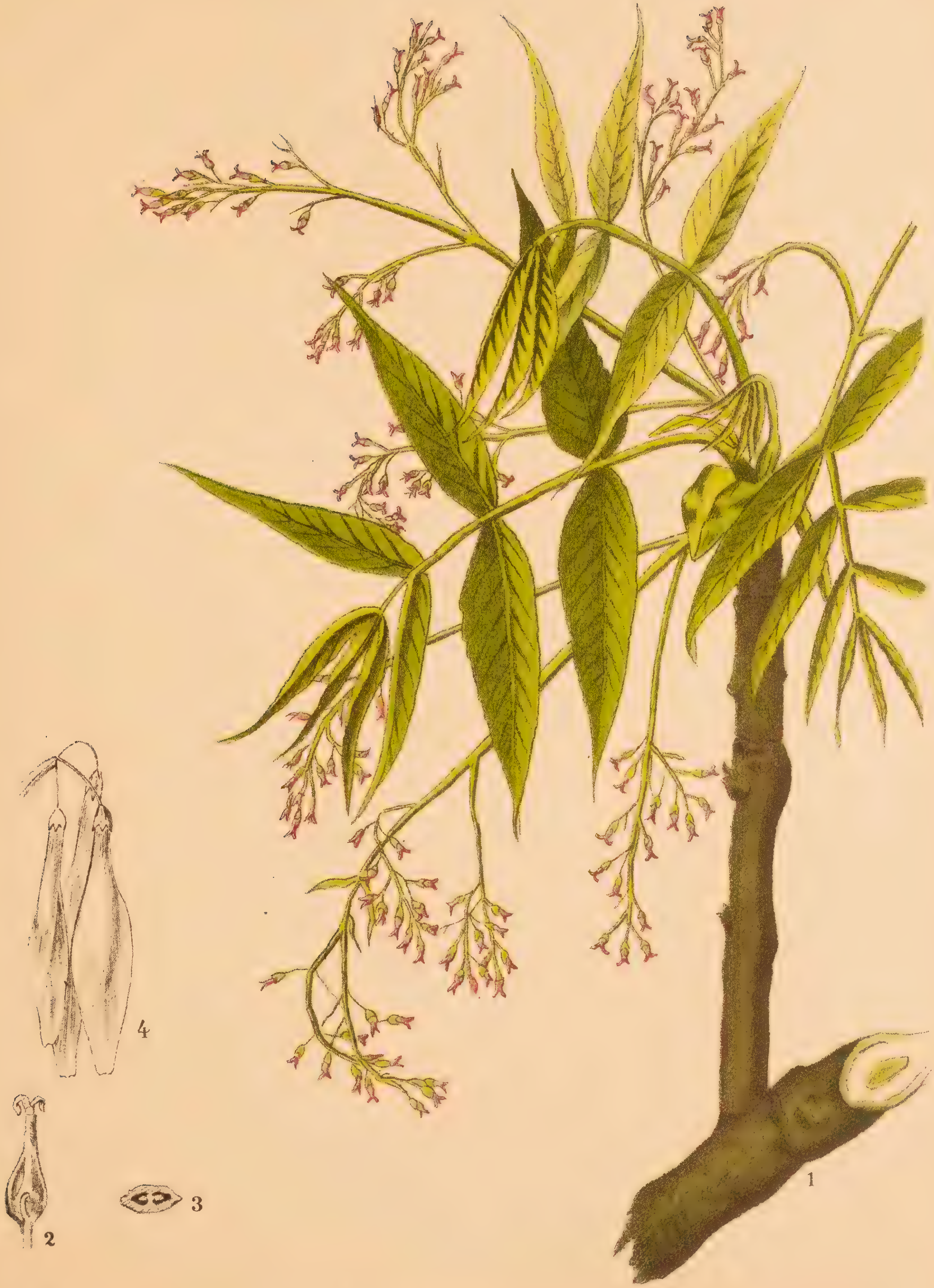
* Dr. Scudder in *Eclectic Med. Jour.*, May, 1876; Dr. Lawche in *N. A. Jour. of Hom.*, 1883, p. 612.



C.M. ad nat del. et pinxt.

FRÁXINUS AMERICÀNA, Linn.

N. ORD.—OLEACEÆ.
Tribe.—FRAXINEÆ.
GENUS.—**FRAXINUS**,[*] TOURN.
SEX. SYST.—DIŒCIA DIANDRIA.

FRAXINUS.

WHITE ASH.

SYN.—FRAXINUS AMERICANA, LINN.; F. ACUMINATA AND JUGLANDIFOLIA, LAM.; F. EPIPTERA, MICHX.; F. DISCOLOR, MUHL.; F. CANADENSIS, GAERTN.; F. ALBA, MARSH.
COM. NAMES.—AMERICAN WHITE ASH; (FR.) LE FRÊNE BLANC; (GER.) WEISSE ESCHE.

A TINCTURE OF THE FRESH BARK OF FRAXINUS AMERICANA, LINN.

Description.—This beautiful timber tree usually attains a growth of from 40 to 60 feet or more; *trunk* generally naked for about half the whole growth; *bark* gray, furrowed, and transversely fissured with great regularity; *branchlets* gray and glabrous; *buds* rust-colored. *Leaves* opposite, odd-pinnately compound, and over a foot in length; *leaflets* 7 to 9, short-stalked, varying from ovate to oblong-lanceolate; all acuminate, entire or sparsely denticulate, pale or whitish, and often pubescent beneath, especially upon the mid-rib; *petioles* glabrous. *Inflorescence* densely paniculate, especially in the male—all developed from special buds, from the upper axils of the previous year's growth; *Flowers* diœcious, apetalous; *Male flowers: Calyx* minute, campanulate, with 4 sharp teeth, or sometimes obsolete or wanting; *stamens* 2 to 4; *filaments* shorter than the large anthers; *anthers* linear-oblong, mucronate. *Female flowers: Calyx* small, persistent; *stamens* even, abortive ones rarely present; *style* erect; *stigma* 2-lobed, *lobes* revolute; *ovary* 2-celled, *ovules* a pair from the summit of each cell, one usually abortive. *Fruit* a dry samara about an inch and a half long; *body* oblong, cylindraceous, terete, barely acute at the base, merely 1-nerved, not margined, about one-half as long as the lanceolate or oblanceolate, slightly emarginate, apical wing. *Seed* oblong, filling the cell; *cotyledons* elliptical; *radicle* slender.

History and Habitat.—The White Ash abounds in rich or moist woods from Canada southward to Florida, and westward to Louisiana, where it flowers on the appearance of the leaves. It was introduced into English gardens in 1723, but does not flourish there as here in its native climate.

The wood is very tough, fine-grained and elastic, and, were it not for its weight, would make fine cabinet material. It weighs 35 lbs., 10 oz. per cubic foot, and has a sp. gr. of .570. Ash furnishes material for the most strained parts of wagons, as well as for all the heavier agricultural implements.

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[*] φράξις, *phraxis*, separation; as the wood splits with facility.

An infusion of White Ash bark has been much used in cases where an astringent tonic was deemed necessary; it also proves cathartic, and has been found useful in constipation, especially of dropsical subjects. It has received much praise in mastitis, and enlargement of the spleen, as well as in some forms of eczema, and in gouty affections. There is a belief extant in the South that the seeds prevent accumulation of fat.

Dr. Porcher quotes some unmentioned author as follows: The leaves of this plant "are said to be so highly offensive to the rattlesnake, that that formidable reptile is never found on land where it grows; and it is the practice of hunters and others, having occasion to traverse the woods in the summer months, to stuff their boots or shoes with White Ash leaves, as a preventive of the bite of the rattlesnake." My father relates that, among the settlers of Orange Co., N. Y., it was always asserted that the Aborigines used to defend themselves from this snake by carrying White Ash leaves about their persons. How much dependence might be placed in this prophylactic, it is hard to tell.

PART USED AND PREPARATION.—The fresh bark of the young twigs, as well as that of the root, is treated in the same manner as that of the previous species.[*]

The tincture has a clear, beautiful, reddish-orange color by transmitted light; an odor resembling that of arnica tincture; an astringent, then very bitter, taste; and an acid reaction.

CHEMICAL CONSTITUENTS.—There is, as yet, considerable doubt concerning the principles constituting this bark, yet the experiments of H. M. Edwards,[†] J. M. Bradford,[‡] Jos. C. Roberts,[§] and especially Edward Kremers,[||] point to, at least, a great similarity between this species and *Fraxinus excelsior* and *nigra*, which, in part, yield the following:

Fraxin, $C_{32}H_{36}O_{20}$.—This glucoside is found also in the bark of *Æsculus*. Fraxin forms in tufts of white, lustrous, acicular forms, slightly bitter and acrid, losing water at 110° (230° F.), fusing at 320° (608° F.) and decomposing. It is sparingly soluble in cold water and alcohol, the aqueous solution giving a beautiful blue fluorescence. Dilute acids resolve the body as follows:

$$\overset{\text{Fraxin.}}{C_{32}H_{36}O_{20}} + (H_2O)_2 = \overset{\text{Sugar.}}{(C_6H_{12}O_6)_2} + \overset{\text{Fraxetin.¶}}{(C_{10}H_8O_5)_2}.$$

Mannite,[**] $C_6H_8(OH)_6$.—This saccharose body, found in many plants, as noted on page 136–2, was identified in this species by Kremers and others. It may be extracted from manna by boiling that substance in alcohol, from which it crystallizes in tufts of long, rhombic needles, possessing a pleasant, sweetish taste. The crystals from our species were found by Kremers to fuse at 162°–163° (323.6°–325.4° F.), and decompose at higher temperature, taking fire and leaving a black residue, which finally volatilized. Mannite from *F. ornus* crystallizes as above, loses no weight at 120° (248° F.), fuses at 165°–166° (329°–330.8° F.), boils at 200° (392° F.), a portion volatilizing; another losing two atoms of the compound radical OH, and becoming a syrupy mass of *mannitan* ($C_6H_8O(OH)_4$), which, if left to itself, reverts to mannite by its hygroscopic power; the rest remaining unchanged; if, however, the temperature is raised to 250° (482° F.), the mass swells up and is destroyed. This body, as isolated from our species, is soluble in cold water and boiling alcohol, and insoluble in ether, which is also true of the old-world product.

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[*] Page 136–2.

[†] *Am. Jour. Phar.*, 1882, pp. 99, 283.

[‡] *Ibid.*, p. 282.

[§] *Ibid.*, 1885.

[||] *Contrib. Pharm. Univ. Wis.*, No. 2, 1866, p. 19.

[¶] A crystalline body, as yet uninvestigated, having a slightly acerb taste.

[**] The *Fraxinin* of Keller.

Oil of Fraxinus.—A small quantity of this volatile body has been isolated or noted by all experimenters upon the bark. It is described by Roberts as somewhat aromatic, bland, and having a yellow color.*

Fraxitannic Acid, $C_{13}H_{16}O_7$.—This body, extracted by Gintl and Reinitzer,† from the leaves of *F. excelsior*, has not been proven in the bark of our species, but the analyses made, except that of Edwards, seem to point to its existence. It is described as an amorphous, yellow-brown, brittle body, soluble in alcohol and water, and precipitable, like other tannins on saturation with common salt, but not by tartar emetic.

[An alkaloid is suspected by Edwards, Roberts, and Kremers, but remains to be proven a separate principle from Fraxin.]

An acrid and a neutral resin, starch, gum, etc., have also been determined by the above experimenters.

PHYSIOLOGICAL ACTION. — The experiments of Dr. Wright‡ gave the following effects from four ounces and a half of the tincture taken in three days: Vertigo and headache, followed by fever; fever sores upon the lips; constipation; scanty urine; pedal cramps; and wakefulness.

DESCRIPTION OF PLATE 137.

1. A female flowering spray, Binghamton, N. Y., May 1st, 1886.
2. Female flower.
3. Section of ovary.
4. Fruit.

(2 and 3 enlarged.)

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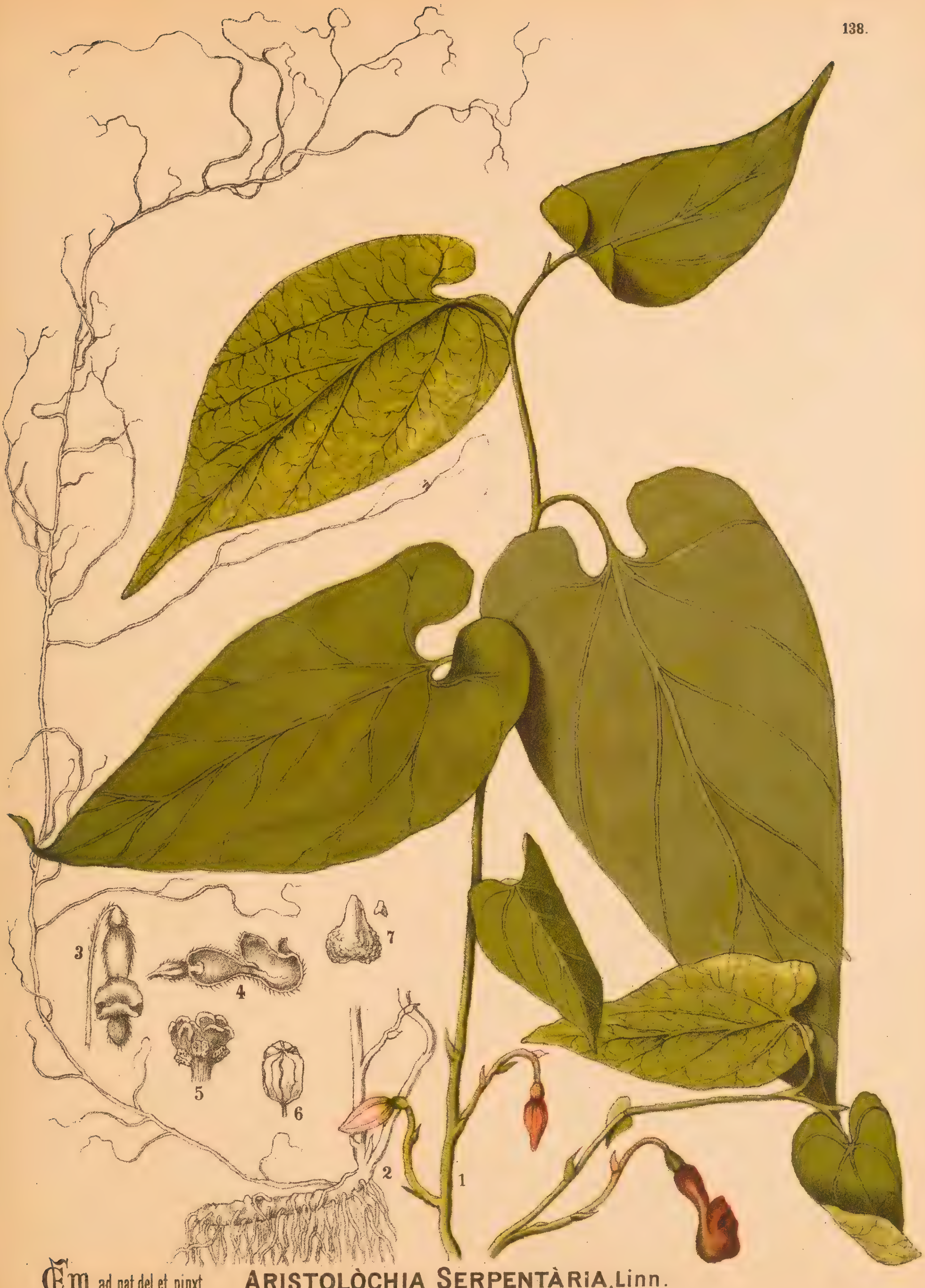
* That from the leaves of *F. excelsior* has the odor of syringia flowers, boils at 175° (237° F.), and has the composition $C_{10}H_{20}O_2$.—*Montash. Chem.*, iii, 745–762, from *Am. Jour. Phar.*, 1883, 371.

† *Ibid.*

‡ *U. S. Med. Investig.*, 1875, 326.



CFm.ad nat.del.et pinxt. **ARISTOLÒCHIA SERPENTÀRIA, Linn.**

GENUS.—**ARISTOLOCHIA**,* TOURN.

SEX. SYST.—GYNANDRIA HEXANDRIA.

SERPENTARIA.

VIRGINIAN SNAKE-ROOT.

SYN.—ARISTOLOCHIA SERPENTARIA, LINN.; A. SERPENTARIA, VAR. BARTONII, DUCH.; A. OFFICINALIS, NEES.; A. SAGITTATA, MUHL.; A. HASTATA, NUTT.; ENDODECA SERPENTARIA & BARTONII, KLOT.

COM. NAMES.—SNAKE-ROOT,† OR WEED; SERPENTARY ROOT, BIRTHWORT, SNAGREL; (FR.) SERPENTAIRE OU COULEUVRÉE DE VIRGINIE; (GER.) SCHLANGENWURZEL.

A TINCTURE OF THE DRIED ROOT OF ARISTOLOCHIA SERPENTARIA, L.

Description.—This small, aromatic perennial herb, grows to a height of from 8 to 15 inches. *Root* somewhat horizontal, more or less knotty, giving off—principally from its under surface—a multitude of long, fibrous, branching rootlets, its dorsum showing the scars of previous stems. *Stems* few or single, erect, flexuous, pubescent, branching at the naked or nodular and bracteolate base. *Leaves* petioled, thin, ovate, ovate-lanceolate, or nearly halbred-shaped, entire, acuminate; *base* cordate, or auriculate. *Stipules* none. *Inflorescence* single, terminal, upon bracted, flexuous peduncles, arising from the base of the stem; *flowers* apetalous, irregular. *Calyx* tubular, sigmoid, pubescent, and adherent to the ovary; *tube* somewhat dumb-bell shaped, *i. e.*, dilated at the apex, gibbous at the base above the ovary, and narrowly constricted in the throat; *limb* flat, more or less obtusely 3-lobed, the opening looking obliquely upward. *Stamens* 6; *anthers* 12 (contiguous in pairs, appearing but 6), sessile, adnate to the back of the stigma. *Style* very short and thick; *stigma* short and sarcous, divided into 3 to 6 flattened lobes, with a thickened apical margin. *Fruit* a naked, somewhat cylindrical, slightly 6-angled, 6-valved, septicidal capsule; *pericarp* smooth, dark brown, and papyraceous; *seeds* several in each cell, somewhat flattened-pear-shaped, caruncululate about the fundus, and channelled upon the upper surface, where the *raphe*—a white, thick, fleshy body—runs along its centre.

Aristolochiaceæ.—A small family of twining shrubs, or low herbs, principally natives of South America, but having a few scattering species in the warmer parts of both hemispheres. *Leaves* alternate, petioled, generally cordate, entire, and deciduous; *stipules* opposite the leaves, or wanting. *Aestivation* valvate; *flowers* brown or lurid, perfect, and usually solitary. *Calyx* tubular, conspicuously petaloid, coherent with the ovary; *limb* coriaceous, regular or irregular. *Stamens* 6 or 12, somewhat united with the style, or more or less distinct, inserted upon an epigynous disk; *filaments* short, or wanting; *anthers* adnate, extrorse, 2-celled; *dehiscence* longitudinal. *Ovary* 6-celled; *style* short and thick, or wanting; *stigmas* radiating, more or less lamellate. *Fruit* a 3- to 6-celled, dry capsule, or succulent berry. *Seeds* numerous, rounded or angular, anatropous; *raphe* prominent and fleshy; *embryo* minute, basal; *albumen* sarcous.

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* Αριϛ'ος, *aris'os*, excellent; λοχὸς, *lochos*, a parturient female; from the medical qualities of *A. Clematitis*, which is said to hasten the delivery of the placenta, and accelerate lochial discharges.

† The American Snake-roots are, beside this species, Black Snake-root (*Sanicula Canadensis*, and *Marilandica*, Linn), *Umbelliferæ;* White Snake-root (*Eupatorium ageratoides*, Linn.), *Compositæ;* Seneca Snake-root (*Polygala Senega*, Linn.), *Polygalaceæ;* and Button Snake-root (various species of *Liatris* (Compositæ), and *Eringium Yuccæfolium*, Michx., Umbelliferæ. These do not include the Rattlesnake roots.

The only plant of this order, outside the genus *Aristolochia*, in our Materia Medica, is the European emetic, cathartic, diuretic, and sternutatory *Asarabacca* (*Asarum Europæum*, Linn.). The American Wild, or Indian Ginger (*A. Canadense*, Linn.), though not exhibiting the action of the European species to any great extent, except, mayhap, the errhine power, will, without doubt, soon be added to our medicaments.

History and Habitat.—Serpentaria is indigenous to North America, ranging from the State of Connecticut to Indiana, and thence southward. It grows in rich, shady woods, and blossoms in July. The flowers of this plant, like those of Asarum, are usually hidden beneath the dry leaves and loose top-mould of its chosen localities.

Strange as it may seem, almost all the species of this large genus are esteemed, by the natives of the countries in which they grow, as remedies against the poisonous effects of snake bites (Alexiterics); this use being fully known to each nation without previous communication with each other. Only one species has been proven beside Serpentaria, viz.: The Brazilian Snake-root *Aristolochia* (*Milhomens*) (*A. cymbifera*, Mart.), which was formerly considered alexiteric, antiparalytic, antiperiodic, and aphrodisiac. Among the more or less prominent species are: The Texan or Red River Snake-root, *A. reticulata*, Nutt., the chemistry of which has been proven by Wigand* to be nearly identical with that of Serpentaria; the North European *A. clematitis*, Linn., once noted for its emmenagogue and febrifugal properties; the South European *A. pistolochia*, having properties similar to those of Serpentaria, and *A. longa*, Linn., *A. bœtica*, Linn., and *A. rotunda*, Linn., used in Germany as emmenagogues, antiarthritics, and stimulants. The South American *A. trilobata*, Linn., is said to be superior in quantity and quality of action to Serpentaria, it being an energetic sudorific in doses of 6 to 20 grains. The Brazilian *A. anguicida*, Linn., is thought, by Humboldt and Lindley, to be the source of the celebrated alexiteric *guaco* of the Colombians; it is stated that a few drops of the juice of this plant, placed in the mouth of a snake, will stupefy it, and a larger dose cause its death. The East Indian *Gardigavapoo* (*A. bracteata*, Retz.), is anthelmintic and antipsoric; and *A. Indica*, Linn., emmenagogue, antiarthritic and stomachic. Other alexiterics are *A. bilobata* (Brazil),

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* *Am. Jour. Phar.*, xvi, 10.

A. sempervirens, Linn. (Colombia), *A. fragrantissima*, Ruiz. (Peru), *A. grandiflora*, Swartz (Jamaica), *A. macroura*, Gomez (Brazil), *A. tomentosa*, Sims (U. S.), *A. hirsuta*, Muhl., and *A. Sipho*, L'Her. (N. A.).

The medical history of Serpentaria begins with Cornutus' first notice of the plant in 1635,* augmented by Parkinson in 1640. These authors, together with Dale (1693) and Geoffroy (1741), speak in high terms of its alexiteric properties. The root was admitted into the London Pharmacopœia in 1650.

Serpentaria has been classed among the diuretics and warm stimulating tonics and diaphoretics, and used with some success in the treatment of low forms of fevers, especially those of a septicæmic type, this use resulting from its alexipharmic properties. It was also used in intermittents and remittents before Quinine had been isolated from bark. Of this use Sydenham says:† "To cure tertians *in poor people who are not able to bear the charge of a long process* (Ital. ours), take of Virginia Snake-weed, finely powdered, one scruple, of white wine, three ounces, mingle them; let the sick take it two hours before the fit, and being well covered with clothing, let him sweat three or four hours, and let it be repeated twice as the fit approaches."‡ Serpentaria was also often given in mixture with Peruvian Bark, thus rendering the latter more active, and at the same time preventing the ill effect of bark upon the stomach; of this Dr. Chapman says,§ that "in some patients such is the irritability of the stomach, that bark, in substance, cannot be retained even in the smallest dose. In such cases we resort to it in decoction or compounded with Serpentaria, which, I think, renders the mixture quite as pleasant to the taste, as would cloves or cinnamon, as comfortable to the stomach, and perhaps more efficacious. *Combinations* too of this sort *will cure intermittents when the bark, alone, fails*" (Ital. ours). Serpentaria was also used in bilious, typhoid, and typhus fevers, small-pox, erysipelas, pneumonia, amenorrhœa, and in fact wherever a stimulating diaphoretic was deemed advisable. It was also considered a stimulating and antiseptic poultice for open, indolent wounds, ulcers, etc.; of this use Dr. Porcher wisely remarks:‖ "This antiseptic power of certain vegetables should be compared with their medicinal effects when prescribed internally."

The officinal preparations of this drug in the U. S. Ph., are: *Extractum Serpentariæ Fluidum; Tinctura Serpentariæ* and *Tinctura Cinchonæ Composita.*¶ The Eclectic preparations are: *Infusum Serpentariæ; Extractum Serpentariæ Fluidum;* and *Tinctura Serpentaria Composita.***

PART USED AND PREPARATION.—The dried root, coarsely powdered, is covered by five parts by weight of alcohol, and kept eight days in a well stoppered bottle, in a dark, cool place, being shaken thoroughly twice a day.

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* *Canadensium Plantarum Historia*, l.c.

† 1679.

‡ Did Sydenham already know, by experience, that the general exhibition of Peruvian Bark in fevers was only applicable to the wealthy who could stand the cost of a long attendance?

§ *Element. Ther.*, ii, 411.

‖ *Resources South. Field and Forests*, l.c.

¶ Cinchona rubra, Citrus medicus, and Aristolochia serpentaria.

** Aristolochia serp., Ipecacuanha, Crocus sat., Camphora, and Opium or Cypripedium.

The tincture, separated from this mass by decantation, pressure, and filtration, should have a beautiful, deep reddish-orange color by transmitted light. Its odor should be decidedly terebinthic, resembling exactly that of the root before extraction; its taste warm, camphoraceous, terebinthic, and at last very penetratingly bitter; and its reaction acid.

CHEMICAL CONSTITUENTS.—*Aristolochin.* This amorphous yellowish body has a bitter and slightly acrid taste, and is soluble both in water and alcohol.[3]

Oil of Serpentaria.—This yellowish-brown oil is obtained by aqueous distillation of the roots. It is lighter than water, and has an odor and taste resembling a mixture of valerian and camphor.[3]

Aristolochia-camphor.—This body, greatly resembling pure camphor, is deposited upon the cool sides of the receiver of the products of an aqueous distillation of the root.[4]

Gum,[1 2 3] coloring matter,[1] bitter-principle,[1 3 4] oil,[1 5] resin,[1 2 3 4] extractive,[1 2] and the volatile oil,[2 3 4] have been determined in this species.

PHYSIOLOGICAL ACTION.—Jörg determined as a result of his experiments* that Serpentaria caused an excitation of the alimentary tract with subsequent determination of blood to all the abdominal viscera, more frequently followed by flatulence than mucous secretion. The symptoms usually following doses of from 2 to 5 scruples of the root were: Copious salivation; eructations; great nausea, and vomiting; a sense of weight in the stomach; distention of the abdomen, with colic and borborygm, frequent expulsion of flatulence, tenesmus and solid stools, with itching at the anus; a sensation of heat, and weight in the head followed by cephalagia; violent and frequent desire to urinate with greatly increased discharges of pale, watery urine.

Description of Plate 138.

1–2. Whole plant from Pittsburgh, Pa., June 18th, 1885.
2. Root, and one full length rootlet.
3. Face view of flower.
4. Longitudinal section of calyx.
5. Style, stigma and stamens.
6. Fruit.
7. Seed.
(5 and 7 enlarged.)

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[1] Tilden's analysis, *Jour. of Mat. Med.*, ii, N. S., 203.

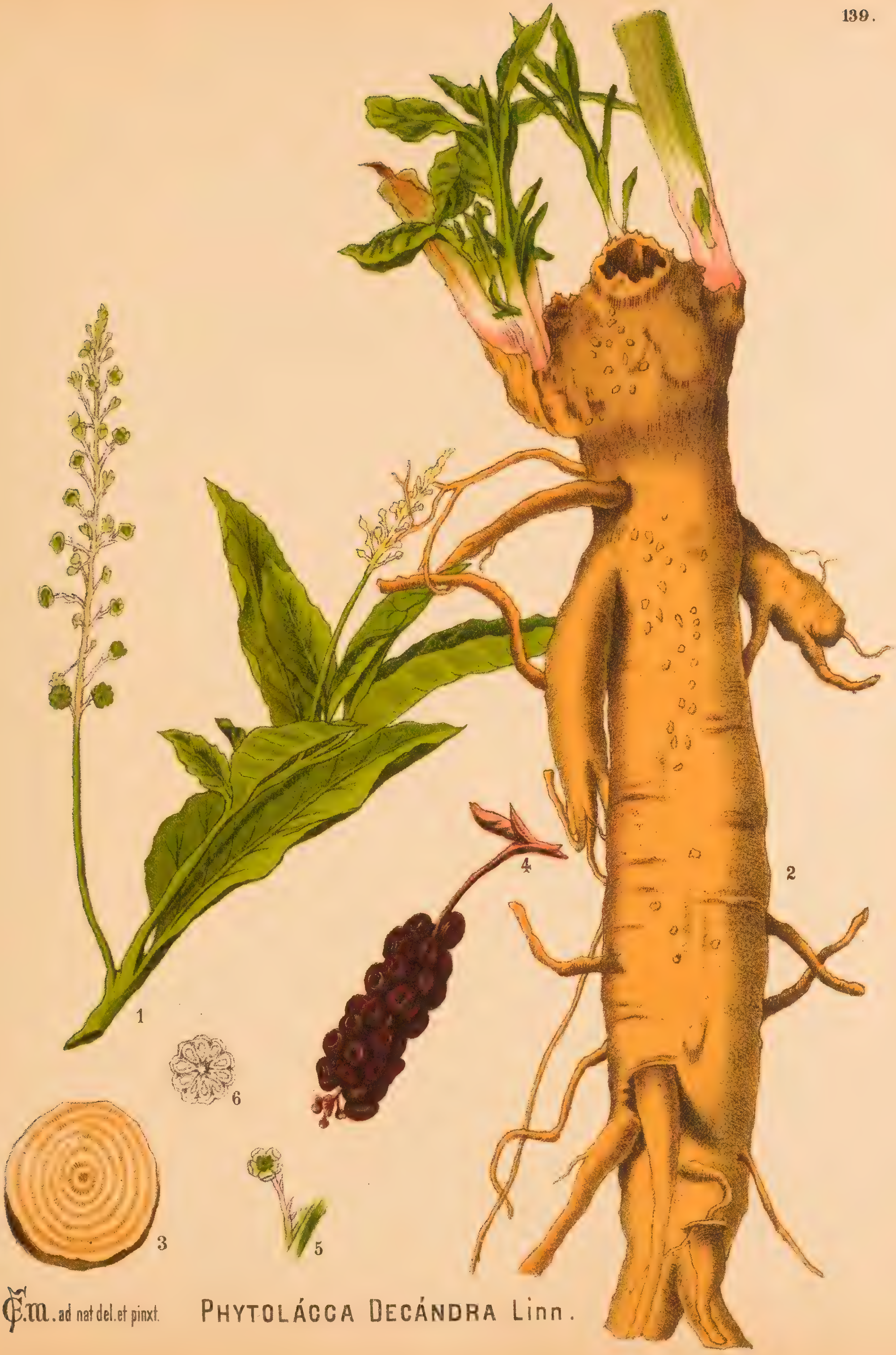
[2] Buckholz.

[3] Chevallier, *Jour. de Phar.*, 1820, 565.

[4] Bigelow, *Am. Med. Bot.*, iii, 85.

[5] Lewis, *ibid.*

* *Materialien zu einer Künftigen Heilmittellehre*, 1825.



G.M. ad nat del. et pinxt. PHYTOLÁCCA DECÁNDRA Linn.

GENUS.—**PHYTOLACCA**,[*] TOURN.

SEX. SYST.—DECANDRIA DECAGYNIA.

PHYTOLACCA.

POKE WEED.

SYN.—**PHYTOLACCA DECANDRA, LINN.; P. VULGARIS, DILL.; P. AMERICANA, BOERHA.; BLITUM AMERICANUM, MUT.**

COM. NAMES.—**POKE WEED OR ROOT,[†] SKOKE, GARGET, CROWBERRY,[‡] PIGEON-BERRY, JALAP, CANCER-ROOT,[§] AMERICAN NIGHTSHADE, POCAN OR COKAN** (*Virginian tribes*), **COCUM** (*Northern tribes*), **CHONGRAS,** (*Louisiana*); (FR.) **MORELLE A GRÀPPES, HERBE DE LA LAQUE;** (GER.) **AMERIKANISCHE SCHARLACHBEERE OR KERMESBEERE.**

A TINCTURE OF THE FRESH ROOT OF PHYTOLACCA DECANDRA, LINN.

Description.—This smooth, purplish stemmed perennial, grows to a height of from 4 to 10 feet. *Root* large, fleshy, fusiform, verrucose, and variously branched, the apex or head showing the scars of the previous stems; the body is easily cut or broken, its section being white, marked by annular rings and distinct radii, and the bark very thin, almost papyraceous. *Stem* stout, cylindrical, hollow and branching; *pith* sectioned by numerous discoid septa, thin in the centre, but so thickened at the edges as to cause the interspaces to be fusiform. *Leaves* alternate or scattered, ample, ovate-lanceolate, acute at each end; *petioles* thick. *Inflorescence* terminal, many flowered racemes, which become lateral and opposite the leaves as the growth proceeds; *peduncles* ascending; *pedicels* divaricate, usually three-bracted, sometimes branched. *Calyx* white; *sepals* 5, petaloid, ovate-obtuse, concave and incurved. *Corolla* none. *Stamens* 10, somewhat shorter than the lobes of the calyx; *filaments* subulate; *anthers* elliptical, 2-lobed. *Ovary* green, composed of 10 carpels closely united into a ring; *styles* 10, short, separate, recurved at the apex; *stigma* simply a stigmatose surface on inner aspect of the recurved portion of the style. *Fruit* a deep purple, depressed-globose, juicy, 10-celled berry, marked with 10 slight furrows; *seeds* 10, one in each cell, vertical; *embryo* curved in a circle around the albumen; *cotyledons* linear; *albumen* farinaceous.

Phytolaccaceæ.—The special characters of this small family are embodied in the above description of its principal and typical genus. The order differs little from the next (Chenopodiaceæ), mostly in having alternate entire leaves, a several celled ovary, compounded of as many carpels united into a circle, and forming a berry in fruit.

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[*] Φυτον, *phyton*, plant; *lac*, lake; from the coloring properties of the berries.

[†] A perversion of the Indian name.

[‡] The true crowberry is *Empetrum nigrum*, Linn. (Empetraceæ).

[§] This name properly designates the American species of *Epiphegus* and *Conopholis* (*Orobanche*), both of which are members of the *Orobanchaceæ*, and are now being proven.

Five other species of Phytolacca are more or less used and have properties similar to ours, viz.: the Mexican and West Indian *P. octandra*, the berries of which are used in lieu of soap; the African *P. Abyssinica;* the recurved leaved *P. dodecandra;* the East Indian *P. icosandra;* and the South American tree-like *P. dioica.*

History and Habitat.—The poke is indigenous to North America, where it is common in light, rich soils, and flowers throughout the summer months. It has become a common weed in all the countries bordering upon the Mediterranean sea, both north and south, undoubtedly introduced from America.

The medical uses of poke-root were handed down to domestic and botanic practice by the aborigines, who valued the plant not only as an emetic, but also as an efficient remedy in gonorrhœal and syphilitic rheumatism.

Phytolacca, among the earlier American writers upon medicinal plants, was considered fully equal to Ipecacuanha as an emetic; its use, however, often caused narcotic effects, very injurious to the system. Its emetic action usually followed doses of 10 grains of the powdered root; both emesis and catharsis were effected by from 20 to 30 grains. The serious difficulties, however, in its employment were a slowness to begin its operation, and also to suspend its catharsis when once begun; it became often necessary to check its action upon the bowels with some preparation of opium. It was considered, however, to be the proper cathartic to use in partial paralysis of the bowels.

The root with lard was found to be an excellent ointment for the cure of many forms of skin diseases, notably: psoriasis, eczema capitis, and tinea circinata; also as a stimulant vulnerary in syphilitic ulcers, and a softening application in mastitis, as well as scrofulous swellings of glands in general. It was also considered an excellent poultice to cause rapid suppuration in felons.

A tincture of the berries was found to be often curative, or at least in some cases palliative, of syphilitic and gonorrhœal rheumatism, as well as non-specific chronic forms of that disease.

As an inevitable result of its uses as above, it was experimented with as a cure for cancer and malignant tumors, but its success in the cure of these terrible maladies never became notable.

I noted in my readings several years ago that the berries had been used for pies by frugal housewives, and often since have half determined to try poke-berry pastry; discretion has, however, always overruled valor, and the much-thought-of pie is still unmade and uneaten. The young shoots, however, make an excellent substitute for asparagus, and I much prefer them, if gathered early and discriminately.

The officinal forms of Phytolacca in the U. S. Ph. are: *Phytolaccæ Bacca* and *Phytolaccæ Radix.* In the Eclectic Materia Medica we find *Cataplasma Phytolaccæ; Decoctum Phytolaccæ; Extractum Phytolaccæ; Pilulæ Phytolaccæ Compositæ;** *Syrupus Phytolaccæ Compositus;*† *Tinctura Phytolaccæ; Tinctura Cimicifugæ Composita; Unguentum Phytolaccæ;* and *Vinum Phytolaccæ Compositum.*‡

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* Phytolacca, Stillingia, and Stramonium.

† Phytolacca, Ampelopsis, Cimicifuga, and Kalmia.

‡ Phytolacca and White turpentine.

PART USED AND PREPARATION.—The fresh root gathered in Autumn, is chopped and pounded to a pulp and weighed. Then two parts by weight of alcohol are taken, the pulp thoroughly mixed with one-sixth part of it, and the rest of the alcohol added. After stirring the whole well, it is placed in a well-stoppered bottle and allowed to stand eight days in a dark, cool place.

The tincture separated from the above by filtration, should have a clear, light yellowish-orange color by transmitted light, a bitterish odor and taste, and a very slight acid reaction.

CHEMICAL CONSTITUENTS.—*Phytolaccine.* Although an acrid principle was deemed present by all previous analysts of the root of this plant, it seems to have remained in some doubt prior to the analysis of Edmond Preston.* His analysis yielded small crystals, almost white when purified, giving precipitates with the four alkaloidal reagents—phosphomolybdic acid, tannin, iodohydrargyrate of potassium, and auric chloride, and were entirely dissipated when fused and subjected to further heat upon platinum foil. They proved entirely soluble in alcohol, moderately so in water, and fully in nitric, sulphuric, and hydrochloric acids, giving, however, no characteristic color test. He also found the hydrochlorate salt, as nearly colorless, strongly acid, acicular crystals, moderately soluble in alcohol, and fully so in water.

Phytolaccic Acid.—There seems to be little doubt that A. C. Erhard's analysis determines such an acid to exist in the root.† Its crystals were in his analysis, however, combined with potassium. A. Terreil ‡ found the same acid salt of potassium in an alcoholic extract of the berries. Isolated, it was amorphous, yellowish-brown, transparent, non-deliquescent and very soluble in water and alcohol. An analysis of the berries, however, by Cramer, elicited no acid answering to the above, but instead, one proving itself to be malic.§ Concerning this acid M. Braconnot says: || The alkali of this plant is neutralized by an acid having considerable affinity to the malic, but with a few shades of difference. With lime and lead malic acid forms flocculent precipitates, very easily soluble in distilled vinegar; but those with the *phytolaccic acid* are insoluble. He farther judges this peculiar acid to be probably a body between malic and oxalic acids, or an oxygenized malic.

Beside the above, potash exists in such large per cent. that some thought has been devoted to the advisability of its manufacture from the roots. Starch, tannin, gum, sugar, resin, and fixed oil have also been determined.¶

The coloring matter of the berries has been largely experimented upon, with a view to its utility as a dye. No mordant, however, is found that will fix its color. With alum, it is somewhat fast but not permanent; with urine, it dyes blue; and alone, it is very fugitive, although very brilliant at first. M. Braconnot, in his experiments with the juice of the berry, turned yellow by the addition of lime-water, found it to be one of the most delicate tests for acids: four times as

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* *Am. Jour. Phar.*, 1884, 567.

† *New Remedies*, 1879, 258.

‡ *Compt. rend.*, xci., pp. 856-8; *Am. Jour. Phar.*, 1881, 325.

§ Walter Cramer, *Am. Jour. Phar.*, 1881, 598.

|| *Annals de Chimie*, vol. LXXII.

¶ Donnelly, *Am. Jour. Phar.*, 1843, 165; Pape, *Ibid.*, 1881, p. 579; Preston, l. c.; Erhard, l. c.

sensitive as an infusion of litmus, but its use limited, as freshness of the juice is absolutely necessary.

PHYSIOLOGICAL ACTION.—The principal primary action of Phytolacca is upon the stomach as an emetic; this action is remarkably slow, it being from an hour to two hours after its ingestion before emesis occurs. The next effects noticed are upon the nervous system. The toxic symptoms from an overdose are: more or less nausea, violent vomiting and purging, great thirst and discomfort in the epigastric region, feeble pulse, dimness of vision, vertigo, drowsiness, great prostration and coldness of the periphery, followed by convulsion, and in one case, death.

The grated fresh root applied to the skin causes a sensation of heat and smarting, followed by redness and finally vesication.

On animals, Dr. Schultz found that the juice of the root in repeated trials resulted only in emesis, catharsis, and drowsiness.

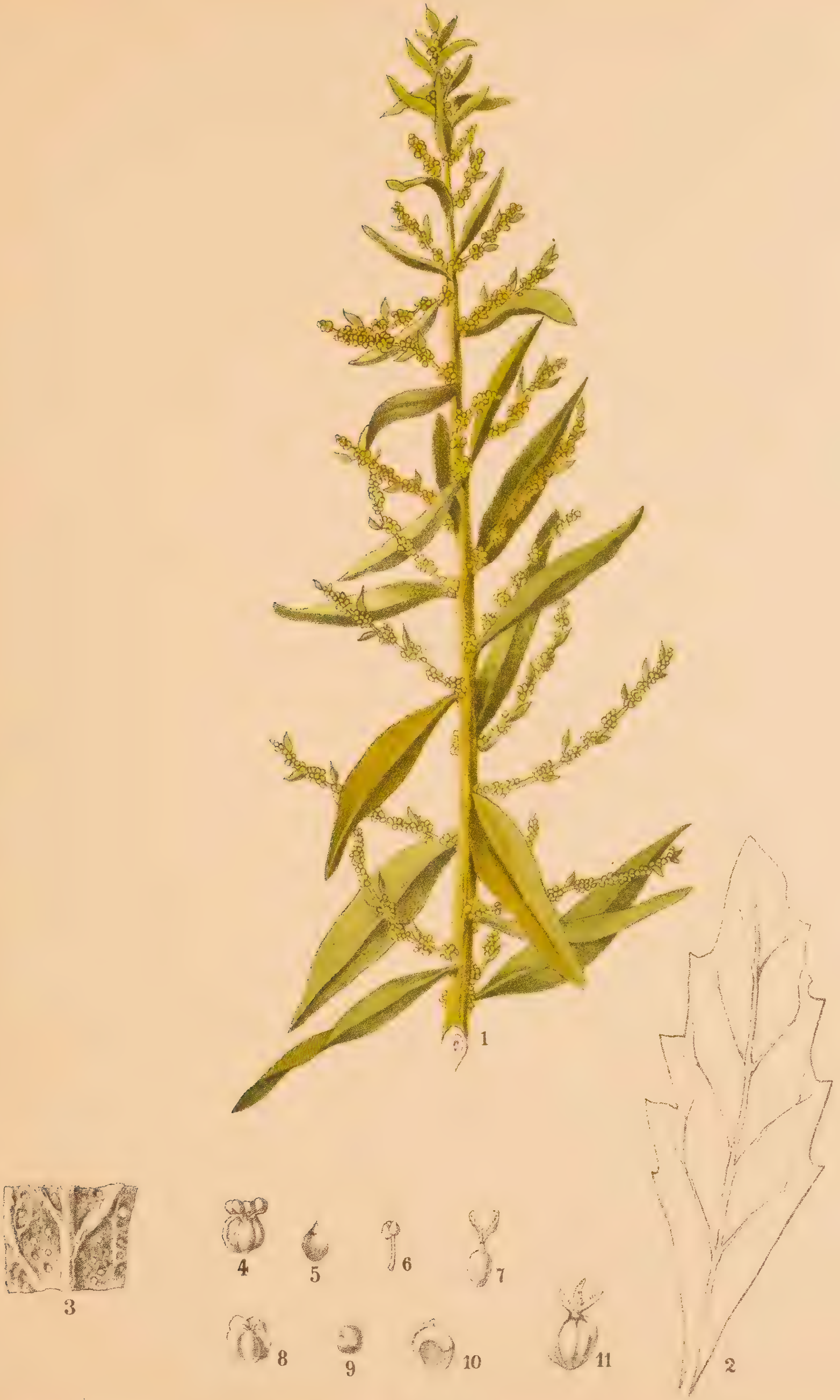
Compiling the symptoms occurring in various cases of poisoning, voluntary and involuntary, the most prominent and duplicating effects are as follows: mental indifference and stupor, dullness, giddiness, and vertigo; severe pressive headache with soreness; dilation of the pupil, with dimness of vision and photophobia; paleness of the face; tongue white-coated, with a very red tip; it feels rough and blistered, and great pain is produced at its root on swallowing; profuse salivation, redness and soreness of the throat, followed by a collection of thick white or yellowish mucus about the fauces; the throat feels full and constricted, almost to suffocation, associated with a sense of suffocation also in the chest; every attempt to swallow attended with terrible shooting pains through the ears; nausea, cramps, and violent vomiting, followed by epigastric tenderness; griping pains in the abdomen, with flatulence; violent purging, continuing until the passages become mucus and blood, and the desire constant; dryness of the larynx, dry hacking cough, and shallow breathing; feeble pulse; stiffness of the neck, and in general, where lymphatic glands abound; constant dull, heavy aching in the lumbar region and sacrum, with painful weakness and stiffness of both the upper and lower limbs; general sense of soreness and prostration, with drowsiness and coldness, followed by profuse cool perspiration.

As Homœopathists, this account of the action of Phytolacca at once impresses us with its certain value in diphtheria, when a like condition exists, as it often does. Its numerous secondary symptoms in various organs noted in the provings, make it a valuable remedy in many forms of disease. On the whole, this remedy is one of the most important of the purely American plants.

Description of Plate 139.

1. End of a flowering branch, Pamrapo, N. J., August 2d, 1879.
2. Root.
3. Horizontal section of root.
4. Fruit.
5. Flower.
6. Section of ovary.

(1-4 once reduced.)



CFM.ad nat.del.et pinxt.

CHENOPÒDIUM ANTHELMÍNTICUM, Linn.

N. ORD.—CHENOPODIACEÆ.

GENUS.—**CHENOPODIUM**,* LINN.

SEX. SYST.—PENTANDRIA DIGYNIA.

CHENOPODIUM ANTHELMINTICUM.

WORMSEED.

SYN.—CHENOPODIUM AMBROSIOIDES, VAR. ANTHELMINTICUM, GRAY; C. ANTHELMINTICUM, LINN.; C. SUFFRUTICOSUM, WILLD.; AMBRINA AMBROSIOIDES, SPACH; ORTHOSPORUM ANTHELMINTICUM, R. BR.

COM. NAMES.—AMERICAN WORMSEED, JERUSALEM OAK,† STINKWEED; (FR.) CHÉNOPODE ANTHELMINTIQUE, L'ANSERINE VERMIFUGE; (GER.) WURMSAAMEN GANSEFUSS, AMERICANISCHER WURMSAAMEN.

A TINCTURE OF THE SEEDS OF CHENOPODIUM AMBROSIOIDES, VAR. ANTHELMINTICUM, GRAY.

Description.—This smoothish, more or less viscid-glandular, and pleasantly-aromatic annual, grows to a height of about 2 feet. *Stem* erect, stout, angular, and grooved. *Leaves* slightly petioled, oblong-lanceolate, repand-toothed or sometimes the lower almost lobed, the upper entire and tapering at both ends. *Inflorescence* in numerous simple, slender, elongated, more or less leafy or leafless spike-like racemes; *flowers* sessile, glomerulate, perfect, and bractless. *Calyx* 5-cleft; *lobes* ovate, pointed, not appendaged nor keeled. *Stamens* 5; *filaments* filiform; *anthers* globular, 2-celled. *Ovary* covered on the top with small oblong stalked glands; *styles* 2 to 3, stigmatic by a fringed inner surface. *Fruit* perfectly enlosed in the calyx, obtusely angled; *seed* lenticular, smooth and shining; *testa* crustaceous. *Embryo* forming about three-fourths of a ring around the mealy *albumen.*

Chenopodiaceæ.—This large family of homely and more or less succulent herbs furnishes to North American Botany 15 genera, comprising 90 species and 15 varieties. *Leaves* mostly alternate, exstipulate, and bractless. *Flowers* minute, greenish; *calyx* free, imbricated in the bud. *Stamens* as many as the lobes of the calyx or sometimes fewer; *filaments* inserted opposite the calyx-lobes or upon their base. *Ovary* 1-celled; *styles* or *stigmas* 2, rarely 3 or 5. *Fruit* a 1-celled urticle or rarely an achenium. *Embryo* coiled into a ring, conduplicate or spiral; *albumen* mealy or sometimes wanting.

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* Χήν, *chen*, a goose; ποῦς, *pous*, a foot; from a fancied resemblance in the leaves.

† This name belongs to *C. Botrys*, Linn.

The only other proven plant in this order is the European Stinking Goosefoot (*Chenopodium vulvaria*, Linn.), which in general practice is considered antispasmodic and emmenagogue. General medical practice notices the following: The Egyptian *Chenopodium baryosmon*, Rom., a fetid emmenagogue; the European and Asiatic Jerusalem Oak (*C. Botrys,* Linn.), a French expectorant; and the American Mexican Tea (*C. ambrosioides*, Linn.), which is considered nervine, anthelmintic, and emmenagogue, and used in chorea. The seeds of the European *Atriplex angustifolia*, Smith, are emetic, as are also those of the Tartarian Garden Orache (*A. hortensis*, Linn.). The European and Asiatic *Salsola Kali,* Linn.; the Spanish *S. sativa*, Löft.; the Mediterranean *S. Soda*, Linn.; and the Mediterranean and Caspian *S. tragus*, Linn., yield the finest Alicant Soda. The European Saltwort (*Salicornia annua*, Smith) is another source of salsoda.

Among the esculent plants of this order the most prominent are: The common Garden Spinach of the Levant (*Spinacia oleracea*, Linn.) and the Beet (*Beta vulgaris*, Linn.). The young and tender plants of the Lamb's Quarter (*Chenopodium album*, Linn.) "are collected by the Navajoes, the Pueblo Indians of New Mexico, all the tribes of Arizona, the Diggers of California, and the Utahs, and boiled as herbs alone, or with other food. Large quantities also are eaten in the raw state. The seeds of this plant are gathered by many tribes, ground into flour after drying, and made into bread or mush. They are very small, of a gray color, and not unpleasant when eaten raw. The peculiar color of the flour imparts to the bread a very dirty look, and when baked in ashes it is not improved in appearance. It resembles buckwheat in color and taste, and is regarded as equally nutritious. The plant abounds in the Navajo country."*

History and Habitat.—American Wormseed is indigenous to Mexico and South America, but has become quite thoroughly naturalized as far north as Missouri and New England, where it grows in waste places about dwellings and in manured soils, and blossoms from July to September. It was introduced into England in 1732. The American Aborigines used the whole herb in decoction in painful menstruation, especially of the older women, but its principal use has been the leaves and seeds as a vermifuge; as such it was noticed by Kalm, Clayton, and Schoepf, and is to-day considered one of the best expellants of lumbricoids known. The principal method of administration is doses of from three to ten drops of the oil on sugar, three times a day for several days, the last dose being followed by a cathartic. The plant is also considered antispasmodic, antihysteric, emmenagogue, and a useful remedy in chorea.

The fruit and *Oleum chenopodii* are officinal in the U. S. Phar., and in the Eclectic Materia Medica, where it is also a compound of *Mistura Chenopodii Composita*† and *Mistura Olei Composita*.‡

PART USED AND PREPARATION.—The fresh seeds are ground to a pulp and weighed. Then two parts by weight of alcohol are taken, the pulp mixed with one-sixth part of it, and the rest of the alcohol added. The whole is then poured into a well-stoppered bottle, and allowed to stand eight days in a dark, cool place.

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* J. R. Dodge, in *U. S. Agric. Rep.*, 1870, 419.

† Castor Oil, Wormseed Oil, Anise Oil, and Tincture of Myrrh.

‡ In this preparation Oil of Turpentine is used in place of the Myrrh.

The tincture, separated from this mass by filtration, has a reddish-brown color by transmitted light; a characteristic repugnant odor; a bitter, astringent taste; and an acid reaction.

CHEMICAL CONSTITUENTS.—*Volatile Oil of Wormseed.* This light yellow oil has a peculiar, strong, and quite offensive odor, and a pungent, bitterish, disagreeable but aromatic taste. Its sp. gr. when fresh is 0.908. It is freely soluble in alcohol, and boils at 190° (374° F.).*

No analysis has yet been made to determine other principles in this species.

PHYSIOLOGICAL ACTION.—The symptoms in a man who took about half an ounce of the drug were those of a narcotico-acrid poison, affecting the brain, spinal cord and stomach. He was insensible, convulsed, and foamed at the mouth.† A man aged thirty took an ounce and a half of the oil and thirty drops of turpentine; the following symptoms came on: Nausea; vertigo; deafness to human voice, hearing acute for louder and more distant noises; aphasia; inability to control the muscles as desired for any continued effort, and fatigue from attempting so to do; hilarity at his futile attempts at talking; repeats his actions like a drunken man; convulsions and finally paralysis of right side; involuntary urination; apoplectic breathing; frothing at the mouth; drenching sweat; opisthotonos; icterus; and death during a comatose state followed; this on the fifth day from the ingestion of the drug.‡

DESCRIPTION OF PLATE 140.

1. Top of plant, Rawlinsville, Pa., Aug. 18th, 1885.
2. Leaf.
3. Portion of leaf, showing glands.
4. Male flower.
5. Sepal.
6. Stamen.
7. Pistil.
8. Fruit and calyx.
9. Seed.
10. Longitudinal section of seed.
11. Female flower.

(3–11 enlarged.)

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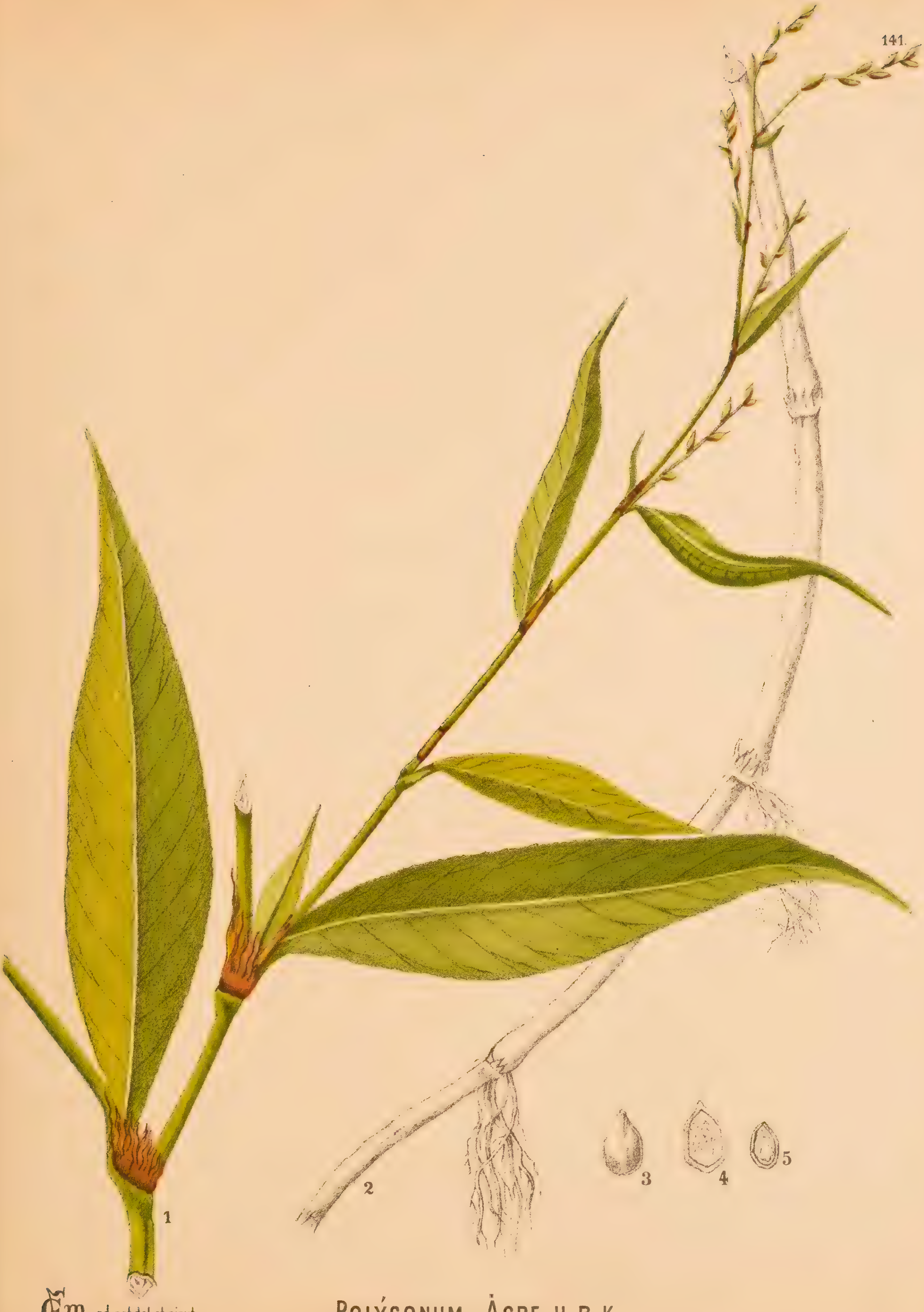
* Garrigues, in *Am. Jour. Phar.*, xxvi, 405.

† *Phar. Jour.*, 1862, 330.

‡ T. R. Brown, M.D., in *Maryland Med. Jour.*, Nov. 1878, 20; Allen, *Encyc. Mat. Med.*, x, 457.



C.M. ad nat del. et pinxt.

POLÝGONUM ÀCRE, H. B. K.

GENUS.—**POLYGONUM,*** LINN.

SEX. SYST.—OCTANDRIA TRIGYNIA.

POLYGONUM.

WATER SMARTWEED.

SYN.—POLYGONUM ACRE, H. B. K.; P. HYDROPIPEROIDES, PURSH. (NOT MICHX.); P. PUNCTATUM, ELL.

COM. NAMES.—WATER PEPPER, SMARTWEED, BITING KNOTWEED; (GER.) KNÖTERICH.

A TINCTURE OF THE WHOLE FRESH PLANT POLYGONUM ACRE, H. B. K.

Description.—This pungently acrid, perennial herb grows to a height of from 2 to 5 feet. *Rootstock* creeping, ligneous; *roots* fibrous. *Stem* simple, smooth, or nearly so, rooting at its decumbent base; *sheaths* cylindrical, bristly fringed. *Leaves* larger and longer than those of *P. hydropiper*, L., taper-pointed. *Inflorescence* in axillary and terminal, erect, slender, filiform, loosely-flowered, spike-like racemes. *Stamens* 8. *Style* mostly 3-parted; *stigmas* capitate. *Achenia* sharply triangular, smooth and shining. *Cotyledons* acumbent, slender; *embryo* in a groove on the outside of the albumen, and curved half-way around it; *albumen* hard and horny.

Polygonaceæ.—This large family of herbs, furnished with watery acid or acrid juice, is represented in North America by 15 genera, comprising 165 species, the truly western genus, Erigonium, alone having 112 species and 10 varieties. The order is characterized as follows: *Leaves* alternate, entire; *stipules* in the form of sheaths (*Ochreæ*), and placed above the usually swollen joints of the stem. *Flowers* mostly perfect; *calyx* more or less persistent, 3- to 6-parted. *Stamens* 4 to 12. *Ovary* 1-celled; *styles* or *stigmas* 2 or 3. *Fruit* dry and grain-like; *seed* single, erect, and orthropous; *embryo* curved or straightish, on the outside of the albumen, rarely in its centre; *radicle* pointing from the base to the apex.

The only proven plant of this family, beside the four treated of in this work, is the Thibetan Rhubarb (*Rheum officinale*, Baill.). The rhubarbs used in general practice, either in lieu of the above species or individually, are: Chinese or Russian Rhubarb (*R. palmatum*, Linn.); English Rhubarb (*R. raponticum*, Linn.); *R. Webbianum*, Royle, *R. emodi*, Wallich, from China; *R. spiciforme* and *R. moorcroftianum*, Royle, from the West Indies; *R. leucorrhizum*, Pal., from the mountains of Dolenkara; *R. undulatum*, Linn., from China and Siberia; *R. capsicum*, Fisch., from the Altaic Mountains; *R. compactum*, Linn., from Chinese-Tartary; and *R. crassinervium*, Fisch., whose nativity is doubtful.

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* Πολύ, *poly*, many; γονυ, *gonu*, knees; from the jointed stems of many species.

Other medicinal plants of the order are: The Seaside Grape of the West Indies (*Coccoloba uvifera*, Linn.), a powerful astringent, whose decoction, evaporated, is known as Jamaica Kino; the fruit of this plant is edible and pleasant, forming an article of commerce in the native markets. Of the genus *Polygonum* many species are astringent, particularly, however, Bistort, the rhizome of *P. Bistorta*, Linn., which is highly esteemed in diarrhœa, leucorrhœa, gleet, and kindred affections; the European *P. amphibium*, Linn., is said to resemble sarsaparilla in its qualities, and has been substituted for it; *P. barbatum*, Linn., of the Cape of Good Hope, is considered diuretic; the fruit of the Knob Grass (*P. aviculare*, Linn.) is said to be emetic and cathartic; while *P. hydropiper*, Linn., is a vesicant and powerful diuretic when fresh.

The Western Indians, and especially those of Alaska, use the leaves of the Round-leaved Sorrel (*Oxyria digynia*, Campd.), chopped with those of the Water-cress and fermented, as a salad; the Indians along the Colorado River gather the abundant seeds of a species of *Rumex*, which they call Yerba Colorado, which they grind and make into bread;[*] while the domestic use of Buckwheat (*Fagopyrum esculentum*, Mœn.) as a flour for breakfast cakes is truly national.

History and Habitat.—Water Smartweed is indigenous to the United States, where it is common, especially southward; it habits ditches and waste places where the soil is wet and rich, and flowers from July to September. The use of Smartweed among the laity, who include *P. hydropiper*, Linn., is very general and extended, especially as a fomentation in ammenorrhœa, dysmenorrhœa, enteritis, and mastitis, and internally in the same troubles and in coryza. The fresh leaves, bruised with those of the Mayweed (*Maruta Cotula*, Compositæ), and moistened with a few drops of oil of turpentine, make a speedy vesicant, and, as such, are highly esteemed; so quick is the action of Smartweed in this direction that it has received among boys the merited but unpleasant name, Ass-smart. A cold infusion has been found very serviceable in nursing sore-mouth, mercurial ptyalism, gout, and dysentery, and externally as a wash for indolent ulcers and painful hemorrhoids. In Mexico the infusion is used as a diuretic, and put into the baths of persons afflicted with rheumatism.

The Eclectic Materia Medica recommends its use in the following forms: *Infusum Polygoni*, *Extractum Polygoni Fluidum*, *Extractum Polygoni*, *Tinctura Polygoni*, and makes it a component of *Pilulæ Polygoni Compositæ*,[†] and *Tinctura Caulophylli Composita*.[‡]

PART USED AND PREPARATION.—The whole fresh plant is chopped and pounded to a pulp and weighed. Then two parts by weight of alcohol are taken, the pulp thoroughly mixed with one-sixth part of it, and the rest of the alcohol added. After having stirred the whole well, it is poured into a well-stoppered bottle, and allowed to stand eight days in a dark, cool place. The tincture, prepared from this mass by pressure and filtration, has a beautiful carmine color by transmitted light; no characteristic odor or taste; and an acid reaction. A penetrating biting sensation is noticed upon the tongue a short time after tasting this tincture.

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[*] J. R. Dodge, in *U. S. Agric. Rept.*, 1870, 422.

[†] Sulphate of Iron, Resin of Cimicifuga, Oleo-resin of Iris, and Extractum Polygoni.

[‡] Caulophyllum, Ergot, Polygonum, and Sabina.

CHEMICAL CONSTITUENTS.—*Polygonic Acid.*[*] This doubtful body is said to form in green, deliquescent crystals, having a bitter and acrid taste, and a strong acid reaction, and to be soluble in alcohol, choloroform, and ether. Messrs. Trimble and Schuchard decide[†] that this body is simply a mixture of impure tannic and gallic acids, together with chlorophyll; and failed in their analysis of this plant to isolate a stable active principle; a volatile principle was, however, appreciable, which gave the pungency of the plant to all preparations made without the application of heat.

PHYSIOLOGICAL ACTION.—The following essentially enumerate the symptoms noted from ingestion of doses of from 10 to 60 drops of the tincture: Dizziness, fullness of the head, and pulsating pain; itching and burning of the eyes; irritation of the pituitary membrane and frequent sneezing; heat in the mouth and throat, with burning and dryness of the fauces; increased appetite and great thirst; nausea and burning of the stomach; rumbling of the abdomen attended by colic; great and ineffectual urging to stool; diarrhœa; urging to urinate; smarting of the urethra, and greatly increased pale urine; sharp stitching or pulsating pains throughout the body; a general feeling of weakness and debility; alternate heat and coldness; and profuse perspiration from moderate exercise. These symptoms point to an irritant to the mucous membranes of high value in the treatment of enteritis, gastritis, cystitis, and other inflammatory diseases of these tissues.

DESCRIPTION OF PLATE 141.

1. Stem in fruit, from Rawlinsville, Pa., Aug. 27th, 1885.
2. A portion of the base of the plant.
3. Seed.
4. Longitudinal section of seed.
5. Horizontal section of same.

(3–5 enlarged.)

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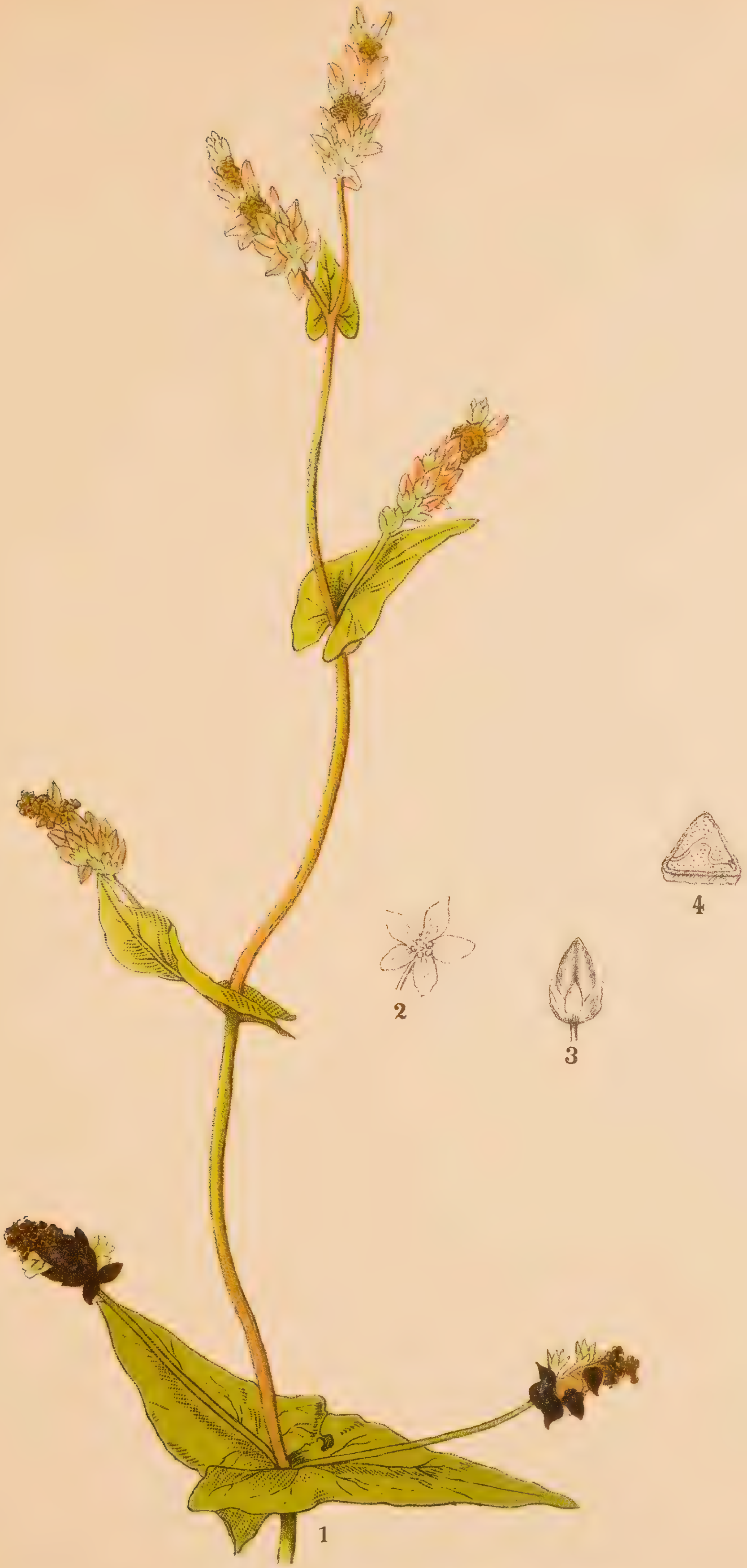
[*] Dr. C. J. Rademaker, *Am. Jour. Phar.*, 1871, 490.

[†] *Ibid.*, 1885, 21.



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FAGOPỲRUM ESCULÉNTUM Moench.

GENUS.—**FAGOPYRUM**,* TOURN.

SEX. SYST.—OCTANDRIA TRIGYNIA.

FAGOPYRUM.

BUCKWHEAT.

SYN.—FAGOPYRUM ESCULENTUM, MOENCH.; POLYOGNUM FAGOPYRUM, LINN.

COM. NAMES.—BUCKWHEAT,† BEECH-WHEAT; (FR.) LE BLÉ NOIR, LE BLÉ SARRASIN; (GER.) BUCHWEIZEN, HEIDEKORN.

A TINCTURE OF THE MATURE PLANT, FAGOPYRUM ESCULENTUM, MOENCH.

Description.—This annual herb grows to a height of from eighteen inches to three feet. The *stem* is sub-cylindrical, delicate, smoothish, juicy, erect, and branched. The *leaves* are triangular-cordate, cordate-sagittate, or halberd-shaped, acute at the tip; the *sheaths* or *ochreæ* semi-cylindrical. *Inflorescence* terminal, and axillary, corymbose racemes, or panicles; *flowers* octandrous, white, pinkish, or greenish. *Calyx* petaloid, equally 5-parted, persistent, withering in fruit. *Stamens* 8; *filaments* filiform, arising from between the 8 honey-bearing glands; *anthers* innate, introrse, composed of 2 nearly separate cells. *Styles* 3, short, more or less persistent; *stigmas* 3, capitate. *Seed* acute, entire, triquetrous, longer than, and situated in, the cup of the calyx; *albumen* copious; *embryo* large, dividing the albumen into two equal parts; *cotyledons* broad, foliaceous, plicate, and twisted. Read description of the N. Ord. under Polygonum, 141.

History and Habitat.—The buckwheat plant is a native of Northern or Central Asia; it was introduced into Europe about the year 1440, and cultivated in England—according to Gerarde—in 1597. In the United States it is largely cultivated for fattening poultry, and for use as flour in breakfast-cakes; the production in 1880 was estimated at 14,617,535 bushels, fully one-third of which was raised in New York State alone. Although buckwheat is far removed from the cereals, yet in the composition of its seed it is strikingly similar to them. Its nutritive value, however, is low as compared to the more important of the cereals, not quite half its weight being fecula, while wheat yields nearly three-fourths its weight. The seed is said to be employed in some parts of Germany in the manufacture of beer.

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* Φηγός, *Phegos*, the beech; πυρός, *pyros*, wheat; the seed being shaped similarly to the nut of the beech (*Fagus ferruginea, Ait.*).

† From the Scottish word "buck," the beech; and the English "wheat."

A field of buckwheat at the prime of its flowering season is very odorous, and attractive to bees, who gather a large store of honey from the glands at the bases of the stamens; this honey, though very dark in color, and not as fine in grain and taste as that from clover, is greatly esteemed. Again, buckwheat is very valuable to the farmer as a reclaimer of soil, both on account of its "weeding" properties, and its value as a fertilizer when plowed under. A crop of this plant will thoroughly kill off weeds, even the Canada thistle, by its quick growth and ample shade. Escaping from cultivation it has become naturalized in many localities, flowering from June to September, and fruiting as it flowers.

The medical history of this plant is not extensive, the only previous uses of importance, as far as I can determine, are those of an infusion of the herb in erysipelas, and an application of the flour, made into a paste with buttermilk, as a poultice to bring back the flow of milk to the breasts of nurses.

The plant is officinal in none of the Pharmacopœias except the Homœopathic.

PART USED AND PREPARATION.—The fresh, mature plant and its seed is chopped and pounded to a pulp and weighed. Then two parts by weight of alcohol are taken, the pulp mixed thoroughly with one-sixth part of it, and the rest of the alcohol added. After having stirred the whole well, pour it into a well-stoppered bottle, and let it stand eight days in a dark, cool place. The tincture, separated from this mass by filtration, should have a deep crimson color by transmitted light, and a slightly acid reaction.

CHEMICAL CONSTITUENTS.—Many analyses of the ash of this herb have been made, but so far none to determine an active principle. The following analyses will serve to show the general constituents of the plant:

	Straw (Wolf).	Seed (Salisb'y).	Seed (Wolf).		Straw (Wolf).	Seed (Salisb'y).	Seed (Wolf).
Carbonic acid, . . .		trace		Magnesia, ...	3.6	15.84	13.4
Silica, ...	5.5	1.95	.0	Potash, ...	46.6	21.27	23.1
Sulphuric acid, ...	5.3	1.55	2.1	Soda, ...	2.2	2.32	6.2
Phosphoric acid, . . .	11.9	48.95	48.0	Chlorine, ...	7.7	.30	1.7
Lime, ...	18.4	3.01	3.3	Organic acids, . . .		2.75	

Mr. Salisbury's proximate analyses* of the seeds gave: Starch, 42.47, sugar and extractive matter, 6.16, gum, 1.60, a light-gray matter insoluble in water and hot alcohol, 10.10, a matter insoluble in water and soluble in alcohol, 2.66, and other common constituents of plants.

Indican.†—This glucoside has been determined in small percentage (Wittstein).

PHYSIOLOGICAL ACTION.—Although we have a good proving of this drug by Dr. Dexter Hitchcock, we have no record of the effects of the substance in quantity. Many individuals cannot partake of breakfast-cakes made from the flour of the seeds without experiencing a severe itching, especially observed about the large joints ; a peculiarity of this itching is that it occurs particularly after removal of the clothing, and when first retiring at night. The eruption incident to, and following this itching, takes the form of vesicles, which degenerate into dry, dark-colored, tedious scabs. Another symptom arising, is a glutinous condition of the otherwise natural feces, making expulsion quite difficult. Increased urinary discharge is also present in many cases.

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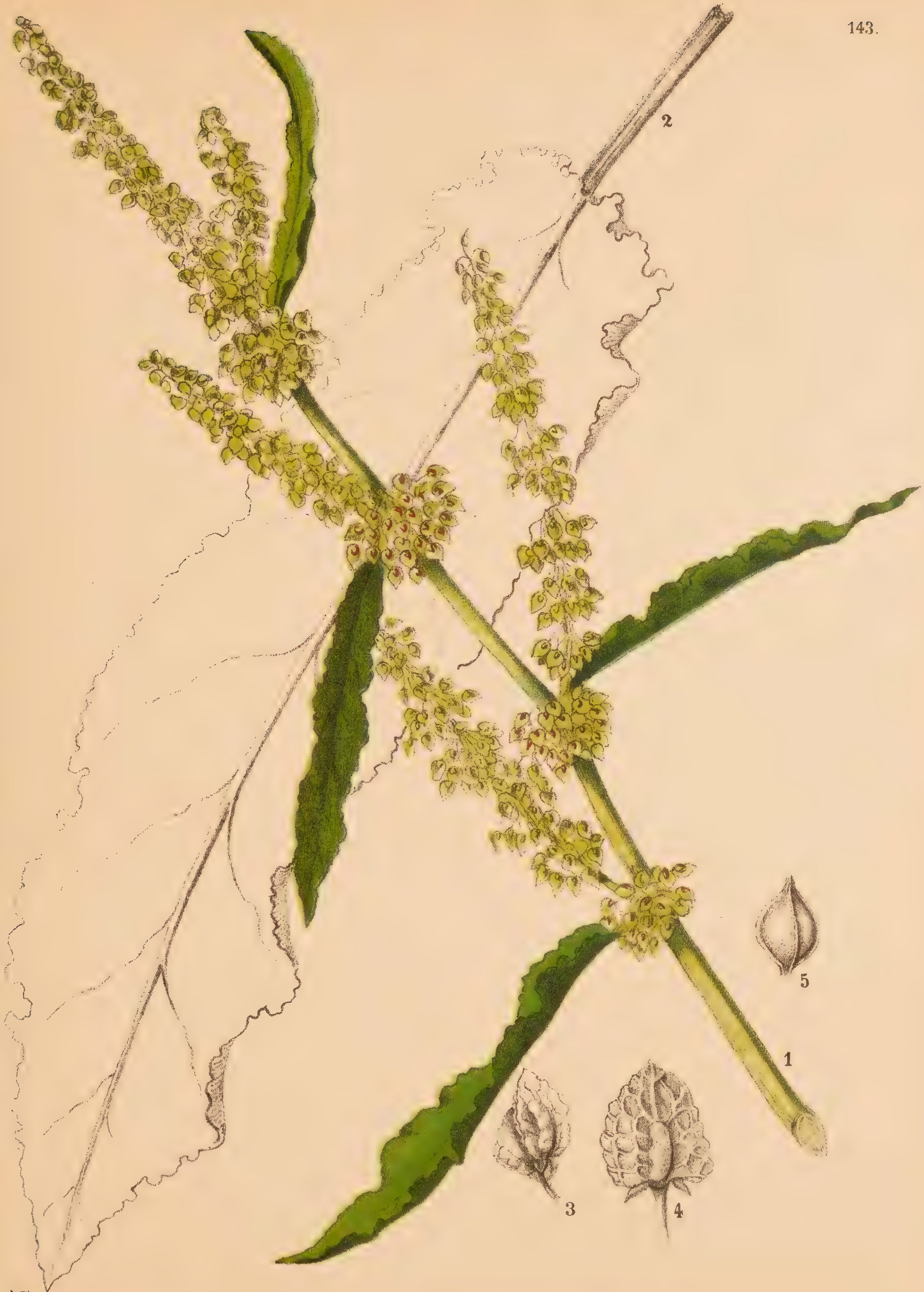
* Nat. Hist. State N. Y., Part V, Agric., p. 274.

† See Baptisia tinctoria, 42.

Description of Plate 142.

1. Top of plant; Chemung, N. Y., Sept. 3d, 1879.
2. Flower (enlarged).
3. Fruit (slightly enlarged).
4. Section of the seed (enlarged).



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RÙMEX CRÍSPUS, Linn.

GENUS.—**RUMEX,*** LINN.

SEX. SYST.—HEXANDRIA TRIGYNIA.

RUMEX.

YELLOW DOCK.

SYN.—RUMEX CRISPUS, LINN.

COM. NAMES.—YELLOW DOCK, CURLED DOCK, GARDEN PATIENCE, NARROW DOCK, SOUR DOCK; (FR.) PATIENCE FRISEÉ; (GER.) KRAUSER AMPFER.

A TINCTURE OF THE FRESH ROOT OF RUMEX CRISPUS, LINN.

Description.—This smooth, perennial herb, grows to a height of from 2 to 4 feet. *Root* deep, large, spindle-shaped, and yellow without and within; *stem* erect, sulcate, smooth, paniculately branching above. *Leaves* all lanceolate, acute, and wavy-curled on the margins, the lower large, tufted, and more truncate than cordate at the base, the upper lanceolate, acute at both ends; *petioles* present with all the leaves, but very long in the lower. *Inflorescence* in prolonged, wand-like racemes, somewhat leafy below; *flowers* crowded in whorls along the rachis; *pedicels* filiform. *Valves* prominently reticulate, rounded, cordate, obscurely denticulate or entire, mostly all of them grain-bearing. *Achenia* acuminate, brown, and shining.

Rumex.—This genus of coarse, homely herbs is characterized as follows: *Leaves* alternate, none of them halbred-shaped; *petioles* somewhat sheathing at the base. *Inflorescence* in crowded whorls, along panicled racemes; *flowers* small, greenish, perfect or monœciously polygamous; *pedicels* jointed near the base. *Calyx* of 6 herbaceous sepals, the 3 outer reflexed, sometimes united at the base, spreading in fruit, the 3 inner (*valves*) larger, veiny, somewhat colored, increasing after flowering, and converging over the fruit, often bearing a grain-like tubercle upon the dorsal surface of the midrib near its base. *Stamens* 6, inserted in pairs opposite the external sepals; *anthers* erect. *Ovary* triquetrous; *ovule* sessile; *styles* 3; *stigmas* tufted. *Fruit* a 3-angled achenium; embryo slender, slightly curved, and lying along one side of the farinaceous albumen; *cotyledons* narrow, incumbent; *radicle* pointing upward.

History and Habitat.—The Docks are some of our most troublesome weeds imported from Europe. The Yellow Dock grows in cultivated ground, and along roadsides, everywhere in the eastern section of the United States; where it flowers from May until August, and ripens its copious seeds from August to October. The root has been used in medicine from ancient times, as a mild astringent tonic, laxative, and depurant, its use being similar to that of rhubarb and of sarsaparilla. A decoction of the root has been found useful in dyspepsia, gouty tendencies, hepatic congestion, scrofula, syphilis, leprosy, elephantiasis, and various forms of scabby eruptions. An ointment of the powdered root with lard, or a cataplasm with cream, has been considered a specific for the cure of itch, and a useful application to cancers, as well as a discutient for indolent glandular tumors. Whatever use the root may have in these latter troubles must reside in the peculiar acid contained in it. Rumex is also considered an excellent dentifrice, especially where the gums are spongy. As a pot-herb the young root-leaves of the Narrow Dock are well known in all country localities.

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* Derivation unknown.

The officinal preparation in the U. S. Ph. is *Extractum Rumicis Fluidum;* in the Eclectic Dispensatory the following are recommended: *Decoctum Rumicis; Extractum Rumicis Alcoholicum; Syrupus Rumicis Compositus;*[*] *Tinctura Corydalis Compositus.*[†]

PART USED AND PREPARATION.—The fresh root, gathered after the fruit is ripe, but before frost has touched the plant, is treated as directed under the herb Polygonum.[‡] The resulting tincture has a clear madder color by transmitted light; a peculiar sour, mousy odor, that I have also noted in Oxalis; a sourish, astringent, and slightly bitter taste; and a strong acid reaction.

CHEMICAL CONSTITUENTS.— *Chrysophanic Acid,* or *Rumicin,* $C_{14}H_{10}O_4$. This dioxyanthraquinone was discovered by Rochelder and Heldt (1843) in the yellow lichen (*Parmelia parietina*),[§] and afterward recognized as such in rhubarb[||] by Schlossberger and Döpping (1844). It has since been found also in Rumex,[¶] Cassia bijuga, and goa powder (*Andira Araroba*).[**] It crystalizes in tasteless, golden-yellow needles or tablets, fuses at 162° (323.6° F.), and sublimes with little change on careful heating. It is slightly soluble in hot water, also in alcohol, and dissolves quite readily in ether. This acid acts as a rubefacient and discutient, and is a valuable agent for destroying parasites of the skin.

The plant also contains sugar, gum, albumen, and tannin.

PHYSIOLOGICAL ACTION.—Rumex causes nausea; watery brown movements of the bowels, urging liquid passages; urging, copious urination; dry, spasmodic, irritating cough; sore, burning, aching, and sticking pains in the chest; increased heart's action; restlessness; itching of the skin; sleeplessness; chills, fever, and perspiration.

DESCRIPTION OF PLATE 143.

1. End of a fruiting branch, Binghamton, N. Y., Aug. 20th, 1886.
2. Outline of a lower leaf.
3. Fruit.
4. Valve.
5. Achenium.

(3–5 enlarged.)

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[*] Yellow Dock, Celastrus, Ampelopsis, and Scrophularia.

[†] Corydalis, Podophyllum, Rumex, Scrophularia, and Alnus rubra.

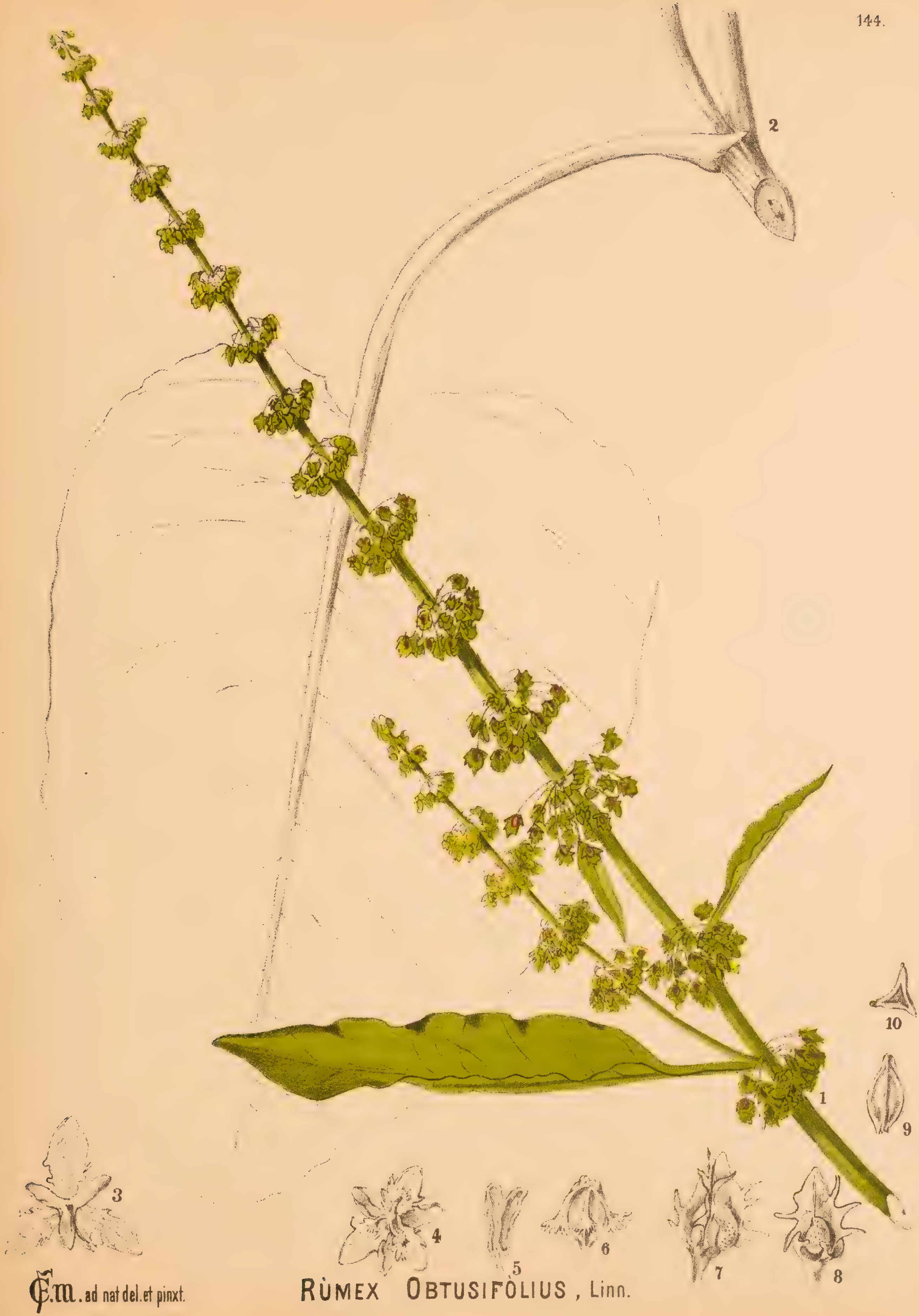
[‡] Page 141-2.

[§] Parietin, Parietinic Acid.

[||] Rhein, Rheic Acid, Rhabarbarin, Rhabarbaric Acid, Rhaponticin.

[¶] Rumic Acid, Rumicin, Lapathin.

[**] Chrysarobin, Chrysarobic Acid.



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RÙMEX OBTUSIFÒLIUS, Linn.

GENUS.—**RUMEX**, LINN.

SEX. SYST.—HEXANDRIA TRIGYNIA.

LAPATHUM.

BITTER DOCK.

SYN.—RUMEX OBTUSIFOLIUS, LINN.; R. DIVARICATUS, ELL.; LAPATHUM ACUTUM.

COM. NAMES.—BITTER DOCK, BLUNT-LEAVED DOCK; (GER.) GRINDWURZ.

A TINCTURE OF THE ROOT OF RUMEX OBTUSIFOLIUS, LINN.

Description.—This roughish perennial weed is of similar growth to the preceding species. *Root* brownish, thick, and branching; *stem* angular and sulcate. *Leaves* rather downy upon the veins underneath and somewhat wavy margined; the lower ovate, cordate, mostly obtuse; the upper lanceolate and acute at both ends. *Flowers* in loose and distant whorls below, more crowded above; *pedicels* recurved. *Valves* ovate-hastate, strongly reticulate, with a few sharp, awl-shaped teeth at the base, one of them principally grain-bearing. (Read description of Rumex, page 143.)

History and Habitat.—The Bitter Dock is in Europe a domestic weed of the worst description—a trait that well characterizes its naturalized state here, where it has rapidly spread wherever man has settled, defacing his fields, gardens, and lawns. It is much harder to exterminate than *R. crispus*, on account of its branching roots, which, like the star-fish, will increase and multiply the faster if broken, cut, or bruised. It flowers a month later than the yellow dock, and fruits at the same period.

The use of this species in medicine is not so prominent as that of *R. crispus*, though it is more bitter, and, if anything, more common. "A decoction of bitter dock root is highly efficacious in obstinate cases of the kind of skin disease called ichthyosis; and when taken in large quantity—as well, indeed, as the decoction of any of the fusiform dock roots—it acts as a purgative, in the same manner as the powder or tincture of Turkey rhubarb."*

The following European and American species of the genus manifest, with R. obtusifolius, a certain line of generic usefulness: Water Dock (*R. aquaticus*); Yellow Water Dock (*R. Britannica*); and Sharp Dock (*R. acutus*). The common Horse Sorrel (*R. acetocella*) is refrigerant, diuretic, and antiscorbutic—characters which also pervade *R. acetosa*, which yields, in Switzerland, part of the Oxalic Acid of commerce. R. acetosa is also highly esteemed in many districts as an esculent, than which, however, *R. scutans* is much more delicate; both are unhealthy if used to excess. In France *R. patientia* is considered tonic, stomachic, and depurant; while the Alpine Dock, or Monk's Rhubarb (*R. alpinus*) is the most active of all species, possessing qualities very like those of *Rheum Rhaponticum*, for a variety of which, indeed, Linnæus mistook it, adding, however, to his observations, "*easdem esse species nullus quidem neget, qui structuram plantæ utriusque inspexerit.*"

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* Wilson's *Rural Cyc.*

PART USED AND PREPARATION.—The fresh root, gathered and prepared as in the preceding species, yields a tincture having a dark, reddish-brown color by transmitted light; a sourish odor; a bitterish astringent taste, and an acid reaction.

CHEMICAL CONSTITUENTS.—*Lapathin*, a body identical with Chrysophanic Acid, as described under R. crispus; a resin; albumen; sugar; gum; starch; and sulphur, have been determined in the root of this species.

PHYSIOLOGICAL ACTION.—The symptoms caused during the experiments of Dr. Widenhorn* are substantially as follows: Pressive headache; epistaxis; distension and pressure in the stomach and abdomen, with flatulence; pain and pressure in the kidneys; weariness and bruised pains in the limbs; and excessive coldness of the feet.

Description of Plate 144.

1. End of a flowering branch, Binghamton, N. Y., Aug. 20th, 1886.
2. Outline of a lower leaf.
3. Flower, showing calyx.
4. Face of flower.
5. Stamen.
6. Pistil.
7. Fruit.
8. Grain-bearing valve.
9. Seed.
10. Horizontal section of seed.

(3–10 enlarged.)

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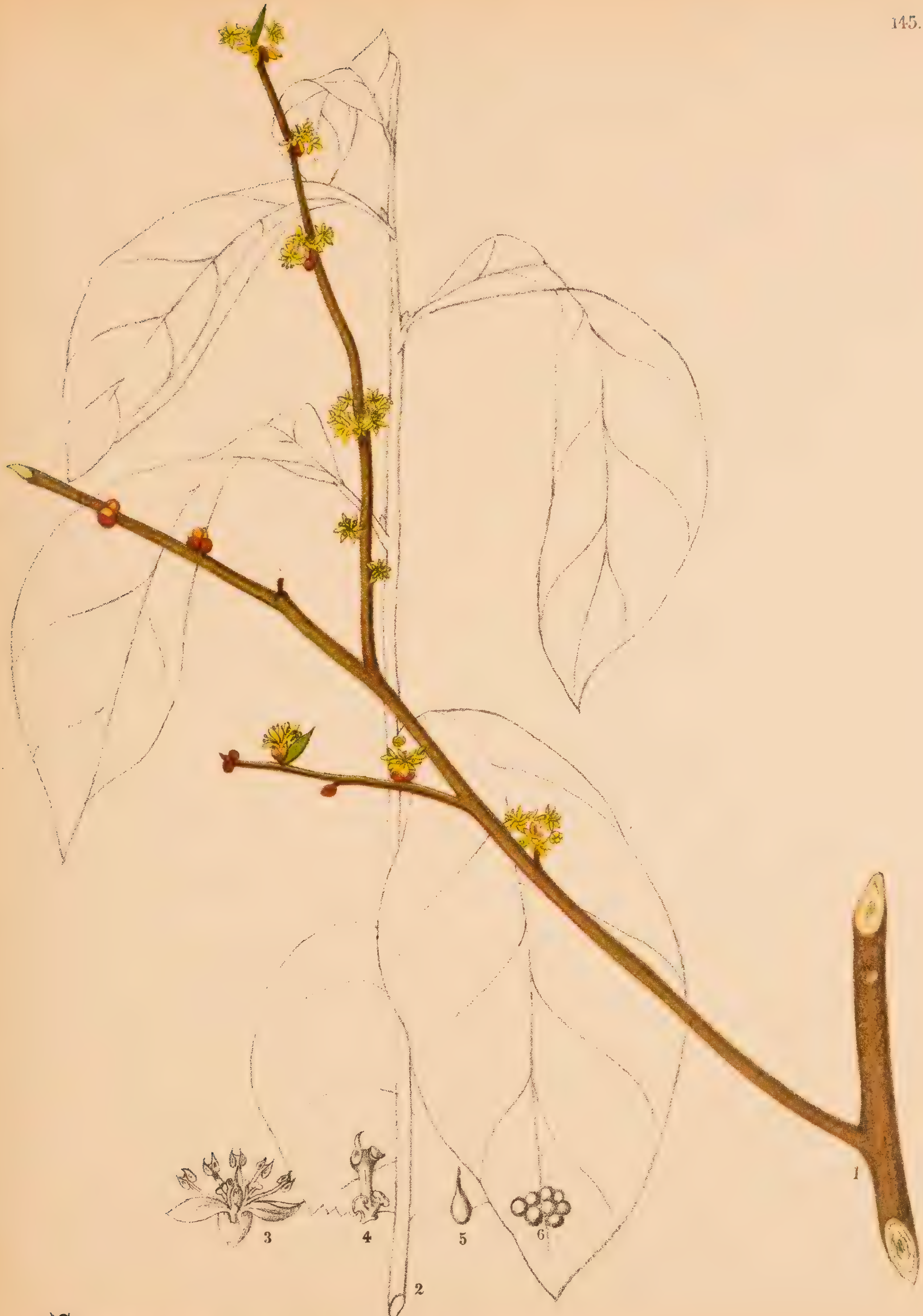
* *Archiv. de la Med. Hom.*, 1835, 305.



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LÍNDERA BENZÒIN, Meisner.

GENUS.—**LINDERA**,* THUN.

SEX. SYST.—ENNEANDRIA MONOGYNIA.

BENZOIN.

SPICE-BUSH.

SYN.—LINDERA BENZOIN, MEIS.; LAURUS BENZOIN, LINN.; BENZOIN ODORIFERUM, NEES; LAURUS PSEUDO-BENZOIN, MICHX.

COM. NAMES.—COMMON SPICE-BUSH, ALLSPICE-BUSH, BENJAMIN-BUSH, WILD ALLSPICE, FEVER-BUSH, SPICE-BERRY; (FR.) LAURIER BENZOIN; (GER.) BENZOELORBEER.

A TINCTURE OF THE FRESH YOUNG TWIGS OF LINDERA BENZOIN, MEIS.

Description.—This aromatic shrub grows to a height of from 6 to 18 feet. *Branches* smooth and maculate. *Leaves* deciduous, nearly glabrous, thin, pale beneath, oblong-ovate and acute at both ends. *Inflorescence* lateral, nearly sessile, umbel-like clusters, composed of umbellets of 4 to 6 flowers; *involucre* formed of 4 deciduous scales surrounding the flowers; *flowers* numerous, polygamous-diœcious, prefolial. *Calyx* open, honey-yellow, 6-parted, membraneous. *Stamens: sterile flowers* 9, in 3 rows; *filaments* of the *inner row* dilated and 1 to 2 lobed, bearing at the base a reniform and more or less peltate gland (Fig. 4); the external 6 simple; *anthers* 2-celled and -valved, opening upward to the apex; *fertile flowers: stamens* 15 to 18 rudimentary, some filiform and pointed, others more or less spatulate. *Ovary* globular or globose-ovoid; *style* short; *stigma* capitellate. *Fruit* a scarlet, ovoid drupe.

Lauraceæ.—A family of aromatic trees or shrubs widely distributed over the temperate and tropical portions of the globe. *Leaves* alternate, simple, entire or sometimes lobed, mostly having pellucid dots. *Flowers* clustered; *æstivation* imbricate in 2 rows; *calyx* regular, free from the ovary; *sepals* 4 to 6, petaloid, mostly fewer than the stamens. *Anthers* opening by 2 to 4 uplifting valves. *Ovary* 1-celled, 1-ovuled; *style* single. *Fruit* a 1-seeded berry or drupe; *seed* anatropous, suspended; *albumen* wanting; *embryo* large amygdalaceous.

We derive but two other remedies from this order, viz.: Camphor, the Chinese and Japanese *Laurus camphorifera* (*Cinnamomum Camphora, Camphora officinarum*); and Cinnamon, the Ceylon *Cinnamomum Zeylandicum* (*Laurus Cinnamomum*). The other products of this order are: Cassia buds, the dried, undeveloped flower buds of the cinnamon tree; Cassia bark (*Cinnamomum aroma-*

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* John Linder, a Swedish botanist of the 18th century.

ticum); Sassafras (*Sassafras officinale, Laurus Sassafras*); and Sweet bay (*Laurus nobilis*), so celebrated by poets for its fragrance and beauty. The genus *Oreodaphne* yields: Jamaica sweetwood (*O. exaltata*); Canary Island *Til* (*O. fœtens*); Isle of France Cinnamon (*O. cupularis*); a Brazilian discutient (*O. opifera*); and a native species much used by the Californian Indians in cephalalgia, and destined to become one of our valuable remedies (*O. Californica*). The genus *Nectandra* affords the much-vaunted substitute for Quinia, sulphate of Berberia, a product of *N. rodiai,* now falling into disuse; Santa Fe Cinnamon (*N. cinnamonoides*); Orinoko Sassafras (*N. cymborum*); the Brazilian Pichurim bean (*N. puchury*); and the Sassafras nuts of the London markets (*N. puchury minor*). Among all the products of this varied family one only is really edible, viz.: the West Indian *Avocado Pear* (*Persea gratissima*).

History and Habitat.—The spice-bush, so well known among the laity on account of its aromatic buds, bark, and berries, inhabits low marsh spots upon the banks of streams from Canada southward to Florida. It blossoms in March or April, before the leaves appear.

The economical use of this shrub has given it many of its vulgar names. During the war of the Revolution the Americans used the powdered berries as a substitute for allspice (Barton). During the war of the Rebellion the people of northern South Carolina used the leaves as a substitute for tea, they affording a pleasant antipyretic and aromatic drink (Porcher); and the berries as before mentioned. In domestic practice the bark, leaves, and berries have been used in decoction to produce diaphoresis and act as a febrifuge; they were considered also as tonic, stimulant, antiperiodic, and anthelmintic. The oil of the berries was often used as an embrocation in neuralgic and rheumatic pains.

There are now no preparations in use officinally except the Homœopathic tincture.

PART USED AND PREPARATION.—The fresh, young twigs gathered before the buds have burst in the spring, are chopped and pounded to a pulp and weighed. Then two parts by weight of alcohol are taken, the pulp mixed thoroughly with one-sixth part of it, and the rest of the alcohol added. After stirring the whole well, pour it into a well-stoppered vial, and allow it stand for eight days in a dark, cool place.

The tincture separated from the above mass by filtration has a light-brown color by transmitted light, an aromatic odor and taste, and a slight acid reaction.

CHEMICAL CONSTITUENTS.—Three analyses have been made of this plant* to determine its active principle, resulting in the separation of a volatile oil, tannin, an essential oil, a tasteless resin, together with other unimportant and general plant constituents. Its medicinal properties, in all probability, lie in the oils, one being cinnamyl compound, the other a substitution product of benzene.

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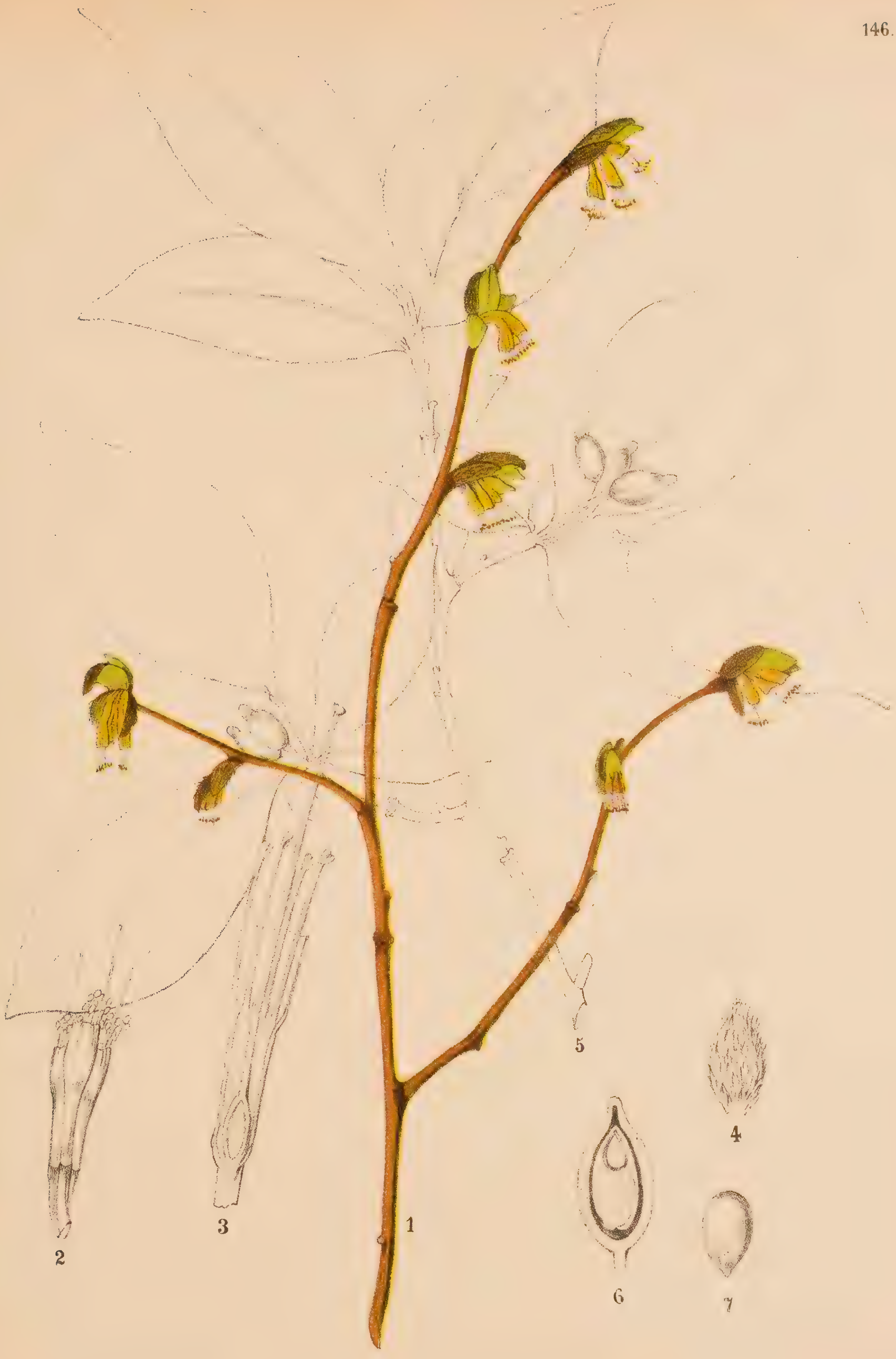
* A. Brockenbrough, Jun., "An Experimental Botanico-chemical essay on Two Native Species of Laurus," 1804; *American Journal of Pharmacy*, 1873, J. M. Jones; 1875, P. M. Gleim.

DESCRIPTION OF PLATE 145.

1. Flowering branch from Binghamton, N. Y., May 3d, 1884.
2. End of branch in leaf.
3. A flower in section.
4. A stamen of the outer row.
5. Pistil.
6. Pollen x 380.

(3-5 enlarged.)



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DÍRCA PALÚSTRIS, Linn.

N. ORD.—THYMELEACEÆ.

GENUS.—**DIRCA**,* LINN.

SEX. SYST.—OCTANDRIA MONOGYNIA.

DIRCA PALUSTRIS.

LEATHERWOOD.

SYN.—DIRCA PALUSTRIS, LINN.

COM. NAMES.—LEATHERWOOD, MOOSEWOOD, WICOPY, ROPE BARK, SWAMPWOOD, THONG BARK, AMERICAN MEZEREON; (FR.) BOIS DE PLOMB;† (GER.) LEDERHOLZ.

A TINCTURE OF THE FRESH INNER BARK OF DIRCA PALUSTRIS, LINN.

Description.—This yellowish, largely-branching shrub, attains a height of from 3 to 6 feet. *Stem* erect; *wood* white, soft and brittle; *bark* remarkably tough and fibrous; *branchlets* jointed; *buds* made up of 3 or 4 large, oval, sometimes persistent, dark hairy scales, from which spring the flowers, leaves, and shoots of the season. *Leaves* alternate, oval-obovate or ovate-lanceolate, deciduous, short petioled, villous when young and smooth when old. *Inflorescence* terminal ternate clusters, those not terminal at the flowering season become so by the extension of the young shoots; *flowers* pendent, honey-yellow, slightly sweet-scented, preceding the leaves. *Calyx* petaloid, funnel-form; *limb* truncate, crenate or nearly 4-toothed. *Stamens* 8, exserted, alternately longer, inserted upon the edge of a disk that encircles the calyx-tube at its point of inflation, and furnished with alternate, small, subulate appendages at their insertion; *filaments* long and slender. *Ovary* ovoid; *style* lateral, filiform, more than twice the length of the stamens; *stigma* capitate. *Fruit* a cluster of three, reddish, ovoid, mucronate, baccate drupes; *seeds* large; *albumen* papyraceous.

Thymeleaceæ.—This small family consists of shrubs having an acrid, tough and fibrous bark. *Leaves* entire; *stipules* wanting. *Flowers* perfect. *Calyx* regular, petaloid, free from the ovary; *limb* 4- rarely 5-lobed, imbricate in æstivation. *Stamens* usually twice as many as the lobes of the calyx. *Ovary* 1-celled; *style* single, lateral, rarely terminal. *Fruit* a baccate, 1-seeded drupe; *seed* suspended, anatropous; *embryo* large; *albumen* thin or wanting.

The only genus of this family that is of special interest to us, besides the one under consideration, is Daphne, of which we use: mezereon (*Daphne mezereum, Linn.*), and the sweet-scented spurge laurel (*Daphne Indica, Linn.*). The economical history of this order is nevertheless interesting, from the varied uses of the species, principally on account of their tough bark. They are mostly indigenous to northern India, South America, and the Cape of Good Hope. The family furnishes a yellow dye for woolens (*Passerina tinctoria*), a pulp for manufacture into paper (*Dais Madagascariensis*), a lace-like material for ropes in the West Indies (*Lagetta lintearia*), and in Madagascar (*Gnidia daphnoides*). Medically it furnishes a Javanese purgative (*Dais octandria*), a Cayenne laxative (*Hernandia Guianensis*), an Indian purgative, depilatory, and antidote to poisons (*Hernandia sonora*), and an edible nut (*Inocarpus edulis*) in the South Sea Islands, said to be similar in taste to the chestnut; this latter is an exception, as the fruits of the thymeleaceæ are generally deleterious. In general the fresh bark is possessed of a caustic acridity, and when applied to the skin acts as a painful vesicant.

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* Διρκη, *Dirke;* the name of a Thebian fountain; probably on account of the habitat of the plant.

† Lead wood, on account of its flexibility.

History and Habitat.—The Leatherwood is indigenous to North America, growing in swampy or springy woods from Canada to Georgia, east of the Alleghany Mountains; it flowers with the maples in April, before the appearance of the leaves. The fibrous bark afforded material for ropes, thongs, cordage, and baskets, to the American aborigines.

The medical history of this drug is slight, the only reference to its use is that of the Indians as a masticatory for aching, carious teeth.

PART USED AND PREPARATION.—The fresh inner bark of the twigs is chopped and pounded to a pulp and weighed. Then two parts by weight of alcohol are taken, the pulp thoroughly mixed with one-sixth part of it, and the rest of the alcohol added. After careful mixture the whole is poured into a well-stoppered bottle and allowed to stand eight days in a dark, cool place.

The tincture, separated from the above mass by filtration, has a clear, greenish, orange-brown color by transmitted light, retains the peculiar odor of the bark, has a sourish then burning taste, and a neutral reaction.

CHEMICAL CONSTITUENTS.—The only attempt at an analysis of this plant, as far as I am able to determine, is that of Dr. Bigelow and his pupil, Dr. Locke. They found that the acridity of the fresh bark was not retained in a distillate or decoction, and determined the presence of:

A bitter resinoid, soluble in alcohol; and an

Acrid principle. This body is apparently fully retained in the tincture prepared as above.

PHYSIOLOGICAL ACTION.—Dr. Locke observes that the powdered root causes emesis and catharsis, and that the bark causes vesication; other observers, who have carried this application farther, find that sores follow that are difficult to heal. Dr. Perkins notes a case of poisoning with the fruit in which vertigo, nausea, stupor, insensibility, and dilatation of the pupils occurred.* The bark when chewed produces ptyalism, burning in the fauces and stomach, and sometimes paresis of the tongue. Dr. Spooner's proving of the drug† substantiates the above, and leads us to the conclusion that Dirca acts as an irritant to the mucous membranes of the gastro-intestinal tract and bladder, as well as to the nerves. This proves the drug to be quite similar to mezereum. It is to be deplored that the unripe fruits are not included in the preparation of the tincture; farther provings with a tincture thus prepared would add a valuable remedy to our store.

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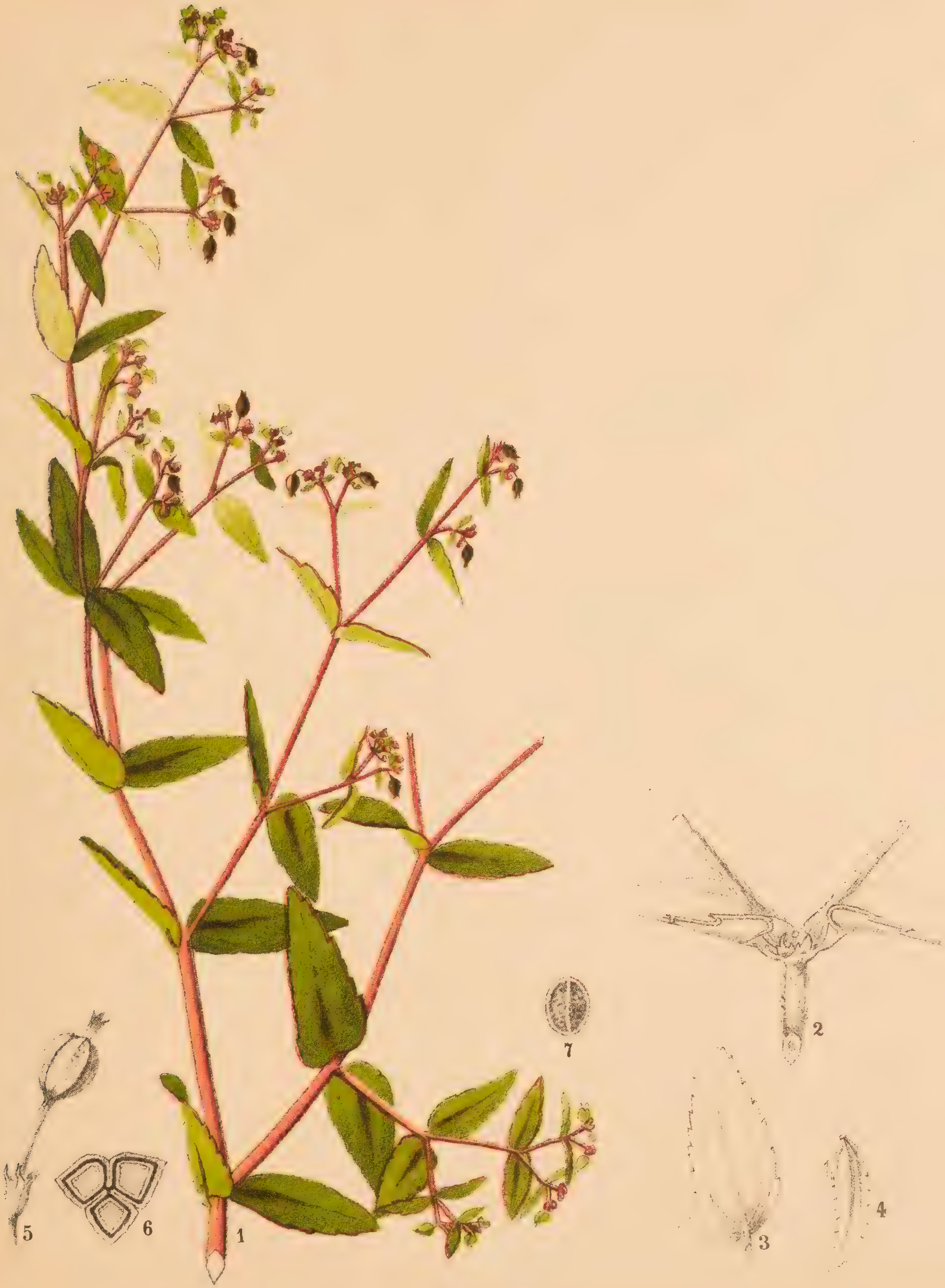
* Bigelow, *Med. Bot.*, vol. ii, p. 157.

† Allen, *Ency. Pure Mat. Med.*, vol. iv, pp. 161–7.

DESCRIPTION OF PLATE 146.

1. Flowering branch, Ithaca, N. Y., April 20, 1880.
2. A flower cluster (enlarged).
3. Half of flower (enlarged).
4. Bract.
5. Branch in leaf and fruit.
6. Section of seed (enlarged).
7. Seed.



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EUPHÓRBIA HYPERICIFÒLIA, Linn.

GENUS.—**EUPHORBIA**,[*] LINN.

SEX. SYST.—DODECANDRIA TRIGYNIA.

EUPHORBIA HYPERICIFOLIA.

COMMON SPURGE.

SYN.—EUPHORBIA HYPERICIFOLIA, LINN.

COM. NAMES.—LARGE SPOTTED SPURGE, BLACK OR MILK PARSLEY OR PURSLANE, SPOTTED EYEBRIGHT; (GER.) JOHANNESKRAUT-BLATTRIGE WOLFSMILCH.

A TINCTURE OF THE WHOLE PLANT EUPHORBIA HYPERICIFOLIA, LINN.

Description.—This inconspicuous annual herb, attains a growth of from 8 to 18 inches. *Stem* ascending or erect, smooth or with scattered hairs, divergently branching and forking. *Leaves* ovate-oblong or linear-oblong, sometimes falcate, oblique, or slightly cordate at the base, acute, serrate, and short-petioled; *stipules* triangular, dentate. *Inflorescence* in loose, leafy, terminal cymes; *peduncles* longer than the petioles; *flowers* numerous. *Involucral appendages* 4, large and white or small and red. *Ovary* 3-celled, each cell 1-seeded. *Fruit* a glabrous, obtusely-angled pod; *seeds* blackish, ovate, obtusely 4-angled, wrinkled, and tuberculated; *caruncle* none.

Euphorbia.—This genus consists of herbs or shrubs with a milky juice. *Leaves* alternate, or in a few cases opposite or scattered, the floral usually verticillate. *Peduncles* terminal, often umbellate-clustered. *Flowers* monœcious, included in a cup-shaped, 4- to 5-lobed involucre, resembling a calyx or corolla, and generally having large thick glands at its sinuses; *glands* with or without petaloid margins; *sterile flowers* numerous, lining the base of the involucre, each from the axil of a little bract, and consisting of a single stamen jointed on a pedicel-like filament; *anthers* with globular cells; *fertile flowers* solitary, in the centre of the involucre, soon, however, protruded upon a long stipe, and consisting of a 3-lobed, 3-celled ovary with no calyx; *styles* 3, each 2-cleft; *stigmas* 6. *Fruit* a compound capsule of 3 carpels, each of which splits elastically into 2 valves. *Seeds* often caruncled, and closely invested in a membraneous axil.

Euphorbiaceæ.—This vast family of mostly tropical plants is represented in North America by 18 genera, 171 species, and 15 varieties, and is characterized as follows: Herbs, shrubs, or trees, with milky, acrid, and mostly poisonous juice. *Leaves* commonly simple; *stipules* present. *Inflorescence* various; *flowers* monœcious or diœcious, sometimes achlamydeous, often with scaly or gland-like appendages. *Calyx* 3-several cleft or wanting. *Petals* mostly wanting. *Stamens* one or many, distinct or monadelphous; *anthers* 2-celled. *Ovary* free, usually 3-celled; *ovules* usually single, sometimes two, hanging from the summit of each cell; *stigmas* as many or twice as many as the cells of the ovary. *Fruit* generally a 3-lobed capsule; *carpels* separating elastically from the persistent axis, and elastically splitting into two valves. *Seeds* anatropous; *embryo* straight, axial; *albumen* fleshy and oily.

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[*] Euphorbus, physician to Juba, king of Mauritania.

Beside the five species treated of in this work, we have provings of sixteen other plants of this order, viz.: The Indian *Cupameni* (*Acalypha Indica*, Linn.); the European and Asiatic Box (*Buxus sempervirens*, Linn.); the Spanish Cascarilla, the bark of *Croton Eleuteria*, Bennett; Cassada, the root of the Brazilian *Jatropha manihot*, Linn.; Croton Oil, a product of the seeds of the India and Ceylon *Croton Tiglium*, Lam.; the English Spurge (*Euphorbia amygdaloides*, Linn.); the Cypress Spurge of England, *E. cyparissias*, Linn.; the British Petty Spurge (*E. Peplus*, Linn.); Euphorbium, the resinous exudation of the North African *E. resinifera*, Berg.; Assacu, the juice of the Brazilian *Hura Braziliensis*, Willd.; the Cuban Physic Nut (*Jatropha Curcas*, Linn.); the Brazilian Stinging Physic Nut (*J. urens*), considered to be the most poisonous plant known; the European Dog's Mercury (*Mercurialis perennis*, Linn.); the West Indian *Manzanillo* (*Hippomanes Manzinella*, Linn.), under the shade of which men are said to die; and Castor Oil, the expressed oil of the seeds of *Ricinus communis*, Linn.

Among the numerous other plants of the order used in general practice, the following will prove of special interest: The Oriental Kamela (*Mallotus philippensis*, Müll.), a purgative noted as a tænicide; the Indian sudorific and cathartic, *Cicca disticha*, Willd.; and *Emblica officinalis*, Gaertn. The root and leaves of the Indian and South American *Phyllanthus Niruri*, Linn., are considered deobstruent and diuretic, a dec oction of the leaves and seeds is said by Martius to be considered a specific cure for diabetes in Brazil; the Indian *P. urinaria*, Linn., is also a powerful diuretic; while *P. virosus*, Willd., of the same country, is used to intoxicate fish. The seed-coat of the Indian *Cluytia collina*, Roxb., is claimed to be powerfully toxic; and the bark of *C. spinosa*, Roxb., is astringent and vermifugal. Turnsole is a purple dye procured from the Mediterranean acrid and corrosive drastic *Croton tinctorium*, Linn.; Mexican Cascarilla, or Copalchi, is the bark of *Croton Pseudo-China*, Schl.; the Indian *C. Pavana*, Hamilt., is used as a producer of Croton Oil, and is supposed to be the original Tilly-seed; one of the finest kinds of Dragon's blood, is derived from the Mexican *C. Draco*, Schl.; this substance is also obtained from the New Granadian *C. hibiscifolius*, H. B. K., and *C. sanguifolius*, H. B. K., of New Andalusia; several other cathartics, or, more properly, purgatives, are derived from this genus, of which the Ceylon *C. lacciferum*, Linn., and *C. suberosum*, H. B. K., of Peru, are prominent; in Brazil *C. campestris*, *C. antisyphiliticum*, and *C. pardicipes*, St. Heil., are used in syphilis; and *C. origanifolius* is said to yield a balsam that greatly resembles Copaiva.

The seeds of the Tropical American *Jatropha multifida*, Linn., are an excellent emetic and purgative; the juice of the Indian *J. glandulifera*, Roxb., is said to be used by the Hindoos as an escharotic to remove films from the eye; and the oil of the seeds of *J. glauca*, Vahl., is used as an application in rheumatism.

The flowers of the East Indian *Caturus spiciflorus*, Linn., are said to be a specific in diarrhœa. The seeds of the Brazilian *Anda-açu* (*Anda Gomesii*, A. de J.) act as a very powerful but safe purgative. The Guayanian *Hovea Guianensis*, Aubl., furnishes Demerara and Surinam Caoutchouc. The roots of the Indian *Traga involucrata*, Linn., are said by Ainslie to be used by the Hindoo doctors to remove old syphilitic cachexias. The juice of the Ganges *Sapium Indicum*, Willd., is highly poisonous; while that of *S. acuparium*, Willd., is really venomous, its exhalations causing erysipelatous inflammation. The Tropical American Sandbox (*Hura crepitans*, Linn.) yields a juice that is exceedingly posionous; it is said to produce blindness in a few days after application to the eyes; the seeds are a dangerous purgative. Another plant, similar in its action, is the Indian *Excœcaria Ayallocha*, Linn., of which Rumphius says that sailors who were sent ashore in Amboyna to cut wood, sometimes became furiously mad from pain produced when the juice of this plant spattered in their eyes, and that some cases of blindness resulted. The Cochin-China *Commia Cochinchinensis*, Lour., yields an emetic and purgative gum; and the West-Indian Jew-bush (*Pedilanthus tithymaloides*, Poit.) is used in venereal complaints, amenorrhœa, and in lieu of Ipecacuanha.

The genus Euphorbia, the type of this order, is one of the largest purgative genera known, many of its species being dangerous, and all more or less active. The Indian *E. Tirucalli*, Linn., is a violent and dangerous cathartic, used also, in small doses, as an antisyphilitic; the Cape *E. heptagona*, Linn., is said by Virey to be used by the Ethiopians as an arrow-poison; *E. tribuloides*, Linn., of the Canary Islands, is said to be sudorific, and *E. Canariensis*, Linn., to act much like Gum Euphorbium; the Indian *E. ligularia*, Roxb., is claimed to be alexiteric, and *E. nereifolia*, Linn., diuretic; the European *E. esula*, Linn., is a dangerous poison, *E. Gerardiana*, Lacq., emetic and cathartic, *E. falcata*, Linn., purgative, and *E. Peplis*, Linn., of like action; the Indian *E. thymifolia*, Linn., is anthelmintic, while the juice of the Brazilian *E. linearis*, Retz., is said to cure wounds of the cornea directly it is applied.

Although we have found this order so highly active and so many of its species veritably toxic, especially the seeds, still it produces one of the finest of all edible nuts—the Tropical American *Omphalea triandria*, Linn.

History and Habitat.—The Common Spurge is indigenous to North America, its typical form being found in the West Indian Islands. It grows generally throughout the country in dry fields, cultivated grounds, and on hillsides, where it flowers from July to September.

This species was probably first introduced in medicine by Dr. Zollickoffer, who spoke of it as astringent and slightly narcotic, and recommended its use in menorrhagia, leucorrhœa, cholera infantum, diarrhœa, and dysentery; Rafinesque adds to this that the plant is also purgative. Martius claims that the plant is valuable in syphilis and ulcerations of the cornea.

PART USED AND PREPARATION.—The whole fresh plant is chopped and pounded to a pulp and weighed. Then two parts by weight of alcohol are taken, the pulp thoroughly mixed with one-sixth part of it, and the rest of the alcohol added. After having stirred the whole well, it is poured into a well-stoppered bottle, and allowed to stand eight days in a dark, cool place.

The tincture, separated from this mass by filtration, has a deep orange-red color by transmitted light; a sweetish vinous odor; an acrid, astringent, and slightly bitter taste; and an acid reaction.

CHEMICAL CONSTITUENTS.—No analysis of this species has been made that identified a special principle. The constituents of the Euphorbias of this country are probably much alike in all species, and, therefore, refer to *E. Ipecacuanhæ*, page 149-2.

PHYSIOLOGICAL ACTION.—Dr. True,* who took a half-pint of an infusion of one-half an ounce of the dried herb in a pint of water, experienced the following effects: Headache with frontal fulness and heat; heat about the eyes; languor and drowsiness; oppression of the stomach; and constipation. The juice applied to the eyes causes severe irritation, with smarting and burning, lachrymation, and momentary blindness; this we have experienced twice while gathering the plant. It is supposed that this species causes the affection in horses called "slabbers."

The Euphorbias in general are severe irritants of mucous membranes, upon which they act as acrid poisons.

Description of Plate 147.

1. Portion of a branch in fruit, Binghamton, N. Y., Sept. 6th, 1885.
2. A portion of the stem, showing method of branching, stipules, and petioles.
3. A leaf, showing obliquity.
4. A falcate leaf.
5. Fruit.
6. Horizontal section of fruit.
7. Seed.

(5-7 enlarged.)

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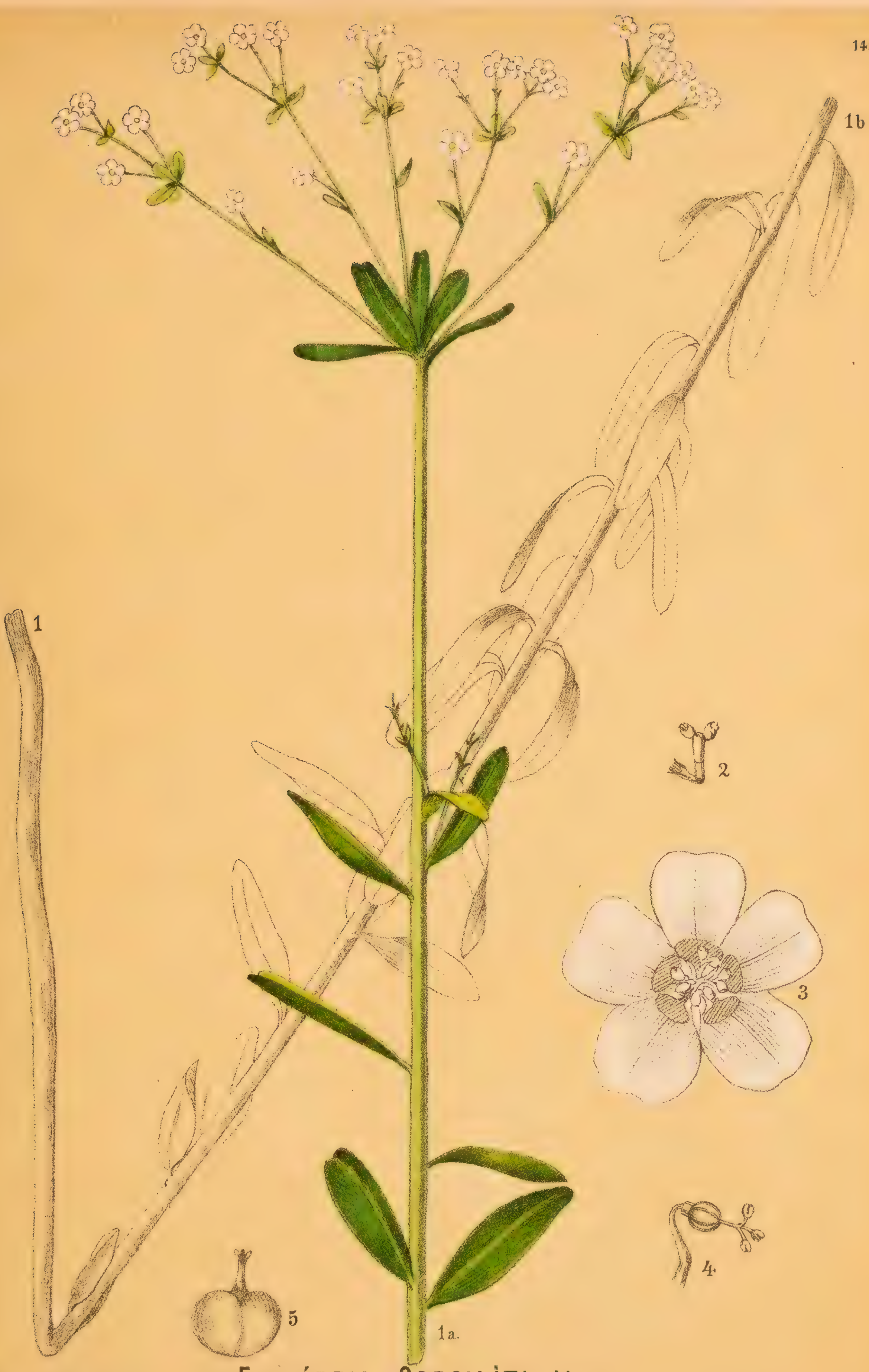
* *Ec. Med. Jour.*, 1875, 260.



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EUPHÓRBIA COROLLÀTA, Linn.

GENUS.—**EUPHORBIA**,* LINN.

SEX. SYST.—MONŒCIA MONADELPHIA.

EUPHORBIA COROLLATA

FLOWERING SPURGE.

SYN.—EUPHORBIA COROLLATA, LINN.; TITHYMALUS MARINUS, PLUK.

COM. NAMES.—FLOWERING SPURGE, BOWMAN'S ROOT, BLOOMING SPURGE, WANDERING MILKWEED, SNAKE'S-MILK, INDIAN PHYSIC, LARGE FLOWERED SPURGE, WILD HIPPO, WILD IPECAC; (FR.) EUPHORBE À GARNDES FLEURS; (GER.) GROSSBLÜTHIGE WOLFSMILCH.

TINCTURE OF THE FRESH ROOT OF EUPHORBIA COROLLATA, LINN.

Description.—This erect perennial herb attains a growth of from 2 to 4 feet, appearing to an observer at a distance to be a member of the umbelliferæ. The *root* is large and branching, sending up a number of simple rounded *stems* glabrous or sometimes sparingly hairy. *Leaves* ascending, those of the stem alternate, of the pedicels opposite, and whorled only at the base of the inflorescence; all ovate-lanceolate or linear, entire, obtuse, equal at the base, sessile or nearly so, smooth above, slightly hairy beneath, from one-half to two inches long, and one-quarter to one-half inch wide. There are always as many leaves to the inflorescence as there are peduncles or pedicels, and situated at their bases. *Stipules* none. *Peduncles* generally 5, sometimes fewer, pedicels and their branches many, all forming a compound umbel-like bi-sexual inflorescence. *Involucres* (floral) numerous, each with 5 showy, obovate, petal-like false lobes; the true lobes minute, inflexed, alternate with the false, and cut into 2 deep, narrow, lanceolate laciniæ. *Fertile flowers* solitary, one to each umbellet, at length protruding beyond its corolla-like involucre. *Ovary* stalked, 3-lobed, 3-celled, each cell 1-seeded. *Style* 3-branched. *Stigmas* 6, a pair to each branch of the style. *Sterile flowers* numerous, their many *stamens* successively developing singly, or in pairs or trios. *Filaments* stalk-like, surmounted by twin *anthers* with globular cells. *Fruit* a smooth 3-carpelled, 6-valved pod. *Seeds* thick, ashen, with a nearly even surface. The natural order is described under E. hypericifolia, 147.

History and Habitat.—The flowering spurge is a favorite medicine among the aborigines of America, being used as a purgative; its action as such fully warranting the favor it has received. The milky juice that flows freely from the wounded plant is an active irritant, causing vesication soon after its application to the skin. The plant grows rather sparsely in dry meadows and open woods in Canada and central United States, blossoming from June to September. E. corollata has been dismissed from the U. S. Ph. (1882); in Eclectic practice use is made of the powdered bark of the root, in doses of from 4 to 30 grains.

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* Euphorbus (physician to King Juba), who introduced Euphorbia.

PART USED AND PREPARATION.—The fresh root gathered in the fall, is chopped and pounded into a pulp and weighed, then two parts by weight of alcohol are taken and the pulp thoroughly mixed with one-sixth part of it and the rest of the alcohol added. After having stirred the whole well, pour it into a well-stoppered bottle and allow it to stand eight days in a dark, cool place. The tincture is then separated by decanting, straining and filtering.

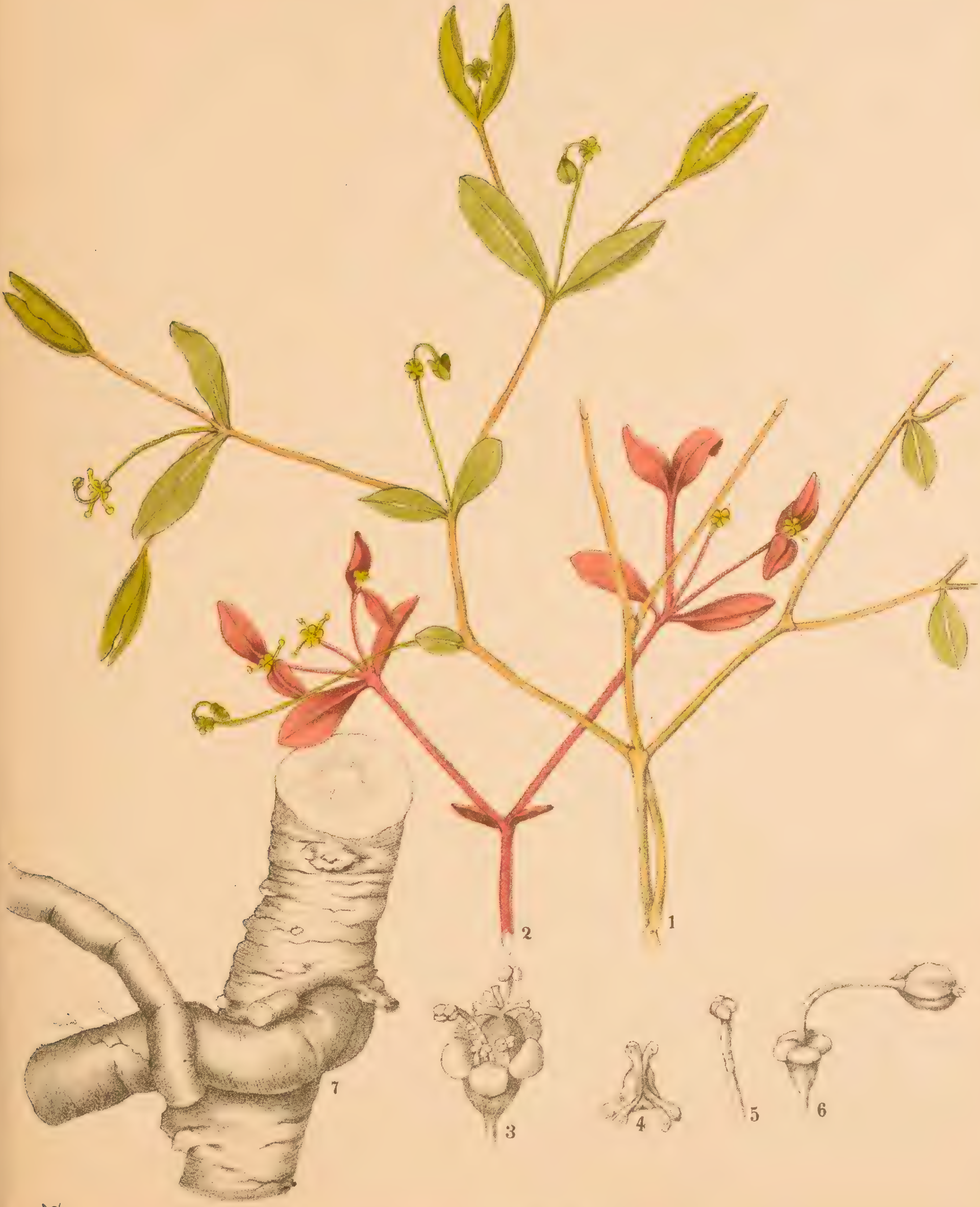
Thus prepared it has a clear, light-yellow color by transmitted light, no distinguishing odor, a sweetish or mawkish taste, leaving a sensation of fuzziness upon the tongue, and a decided acid reaction.

CHEMICAL CONSTITUENTS.—At the present we can do no better than to refer to E. hypericifolia, 147, for the chemistry of this plant, for so far only the generic qualities have been determined, no distinct and specific analysis having been made.

PHYSIOLOGICAL ACTION.—The action of the Euphorbias generically will be found under 147, the specific physiological action of E. corollata is so far little investigated. The minute effects can best be determined by consulting the provings contained in the Encyclopædia of Materia Medica, by Dr. T. F. Allen, vol. iv., p. 244.

Description of Plate 148.

1.—1*a*. Whole plant from the banks of the Chemung River, its principal habitat east. Elmira, N. Y., July 19, 1879.
2. Stamen (enlarged).
3. Sterile flower (enlarged).
4. Pistil (enlarged).
5. Fruit (enlarged).



C.F.M. ad nat del. et pinxt.

EUPHÓRBIA IPECACUÁNHÆ, Linn.

GENUS.—**EUPHORBIA**, LINN.

SEX. SYST.—DODECANDRIA TRIGYNIA.

EUPHORBIA IPECACUANHÆ.

AMERICAN IPECAC.

SYN.—EUPHORBIA IPECACUANHÆ, LINN.

COM. NAMES.—AMERICAN IPECAC,* WILD IPECAC,† CAROLINA IPECAC, IPECACUANHA SPURGE, CAROLINA HIPPO; (FR.) EUPHORBE VOMITIVE; (GER.) BRECHWOLFSMILCH.

A TINCTURE OF THE WHOLE FRESH ROOT OF EUPHORBIA IPECACUANHÆ, L.

Description.—This tufted, shrub-like perennial grows to a height of from 6 to 12 inches. *Root* long, perpendicular, thick, subcylindrical, branching; *stems* many from the same root, erect or more frequently diffusely spreading, divergently forking throughout; *leaves* opposite, entire, glabrous, varying from obovate-oblong to narrowly-lanceolate, all very short petioled, and varying in color from shining green to brilliant red. *Inflorescence* on long peduncles arising from the forks; *involucres* 4 to 5 lobed; *lobes* ovoid; *glands* 5, obtuse, somewhat reniform, exappendiculate. *Fruit* a long pedicelled, obtusely angled, nearly smooth pod; *seeds* ovate, white, sparsely pitted with impressed dots; *caruncle* none. Read the description of Euphorbia and Euphorbiaceæ under E. hypericifolia, 147.

History and Habitat.—The Ipecac Spurge is indigenous to the low sandy soils of the Atlantic seaboard from Florida to Mississippi, and northward to Long Island. This very singular and extremely amorphous plant represents in itself seven "Rafinesquian species," so greatly does it vary in form, color, inflorescence, and leaf.

The emetic property of this root was well known to the Aborigines, but the first experiments with it in practice were those of Prof. Hewson and Dr. J. R. Barton, though the first mention of its emetic properties is that by Dr. Puihn. Shoepf adds nothing to what was already known; nor does Prof. Barton in his Collections. Prof. W. C. P. Barton considered it equal if not superior to imported Ipecacuanha.‡ Dr. Bigelow observes,§ from his own experiments and those of Dr. McKeen at his instigation, that the species is an active emetic, safe when prudently administered, but injurious to the nervous system, and wanting in the mildness that characterizes officinal Ipecacuanha. The dose of the powdered root is from 10 to 20 grains for its emetic action, which also at times proves cathartic, thus making it more active than Ipecacuanha in proportion to the amounts used. The American

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* A name also applied to *Gillenia stipulacea*, Nutt. (Rosaceæ.)

† Also applied to *Gillenia trifoliata*, Moen. (Rosaceæ.)

‡ *Am. Med. Bot.*, 3, 117.

§ *Veg. Mat. Med.*, 1, 217.

Ipecac acts as a hydragogue, expectorant, diaphoretic or emetic, according to the size of the dose.

PART USED AND PREPARATION.—The fresh root, treated as directed under *E. hypericifolia*, yields a tincture having a clear, light lemon-yellow color by transmitted light, a sweetish odor, an acrid taste, and an acid reaction.

CHEMICAL CONSTITUENTS.—No analysis yet made of this species has resulted in the separation of the glucoside it seems to contain. Dr. Bigelow's analysis separated caoutchouc, resin, and mucus; to which Mr. Cullen adds, by analysis, coloring-matter and starch.

Euphorbon, $C_{26}H_{44}O_2$.*—By evaporating the tincture to an extractive mass, dissolving in alcohol containing caustic potash, evaporating, and neutralizing the residue with dilute acetic acid, a brown body was precipitated (Euphorbic acid). On digesting the menstruum, separated from this precipitate, in ether, and evaporating spontaneously, crystals were obtained; these recrystallized frequently, and, boiled in a slightly-colored solution of permanganate of potash, resulted as tasteless, colorless, imperfect crystals, insoluble in water, slightly soluble in alcohol, readily soluble in ether, benzol and chloroform; melting at 241° (116.1° C.); and answering to the tests for the Euphorbon of Flückiger.

Euphorbic Acid.†—This amorphous, brown body, obtained as above, was slightly acrid, very bitter, soluble in water and alcohol, and capable of neutralizing slightly alkaline solutions.

The two bodies resulting as above were too small in quantity for experimentation in this analysis, as I had but little of the root in my possession. They are without a doubt identical with the bodies under which names I have described them, as given by experiments upon Gum Euphorbium from *Euphorbia resinifera*, Berg.

PHYSIOLOGICAL ACTION.—Euphorbia acts as an irritant to the mucous membranes throughout the alimentary tract, not only by its presence, but after the powder taken is all evacuated; vomiting once commenced is associated with vertigo, dimness of vision, flashes of heat and thirst; when the vomiting ceases, purging commences and lasts some time, often followed by prostration and cold sweat.‡

DESCRIPTION OF PLATE 149.

1 and 2. Flowering stems, Landisville, N. J., June 8th, 1885.
3. Flower and involucre.
4. Styles and stigmas.
5. Stamen.
6. Disk and fruit.
7. A portion of the root.
(3-6 enlarged.)

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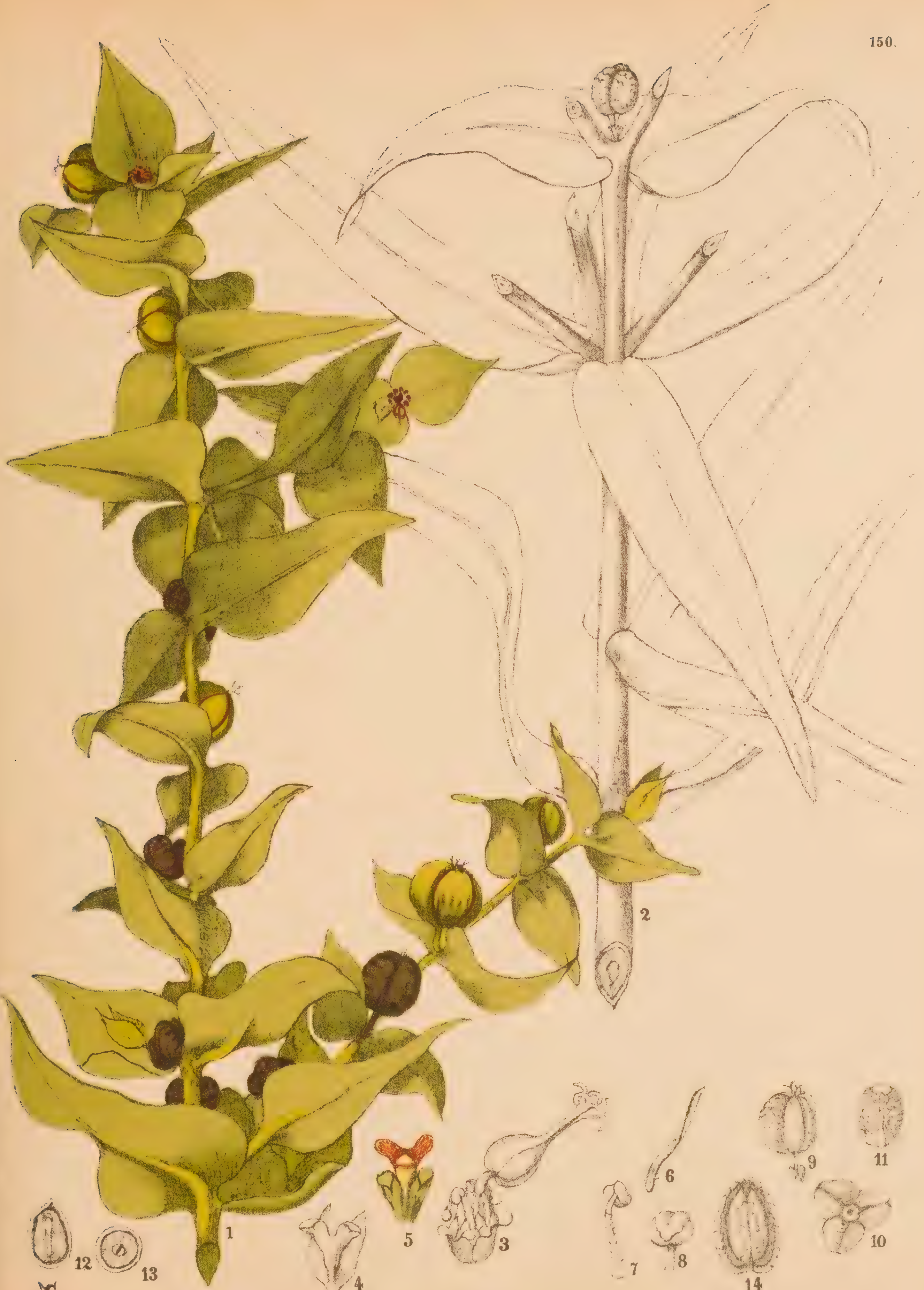
* Flückiger.

† Buchheim.

‡ Bigelow, *Am. Med. Bot., loc. cit.*



Ɛ.M. ad nat del. et pinxt.

EUPHÓRBIA LÁTHYRIS, Linn.

EUPHORBIA LATHYRIS.

CAPER SPURGE.

SYN.—EUPHORBIA LATHYRIS, LINN.; TITHYMALUS LATHYRIS, KL. & GAR.

COM. NAMES.—GARDEN SPURGE, CAPER SPURGE, MOLE PLANT OR TREE; (GER.) PURGIENKÖRNER.

A TINCTURE OF THE WHOLE PLANT EUPHORBIA LATHYRIS, LINN.

Description.—This glabrous annual or biennial plant attains a growth of from 2 to 3 feet. *Stem* erect, stout, and cylindrical. *Leaves* entire, opposite, decussate or strongly sessile, thick, linear- or oblong-lanceolate, pale. *Inflorescence* umbelliform; *umbels* 4-rayed, then forking; *leaves* ovate, long pointed, and somewhat cordate at the base; *involucral lobes* deeply cleft into two pointed divisions; *glands* lunate, 2-horned; *horns* orange colored, obtuse. *Filamental peduncles* hairy: *abortive stamens* ligulate, hairy at the base. *Stigmas* recurved. *Fruit* a large, 3-carpelled capsule, red in the sulci when immature, black throughout when ripe; *carpels* obtusely 3-angled; *seeds* carunculate.

History and Habitat.—The nativity of the Caper Spurge is doubtful; it is, however, probably indigenous to Eastern Europe and Great Britian. It is adventive in this country, especially in New Jersey and Eastern Pennsylvania, where it grows in dry, sterile places, and blossoms from July to September. Several of the European Spurges, brought to this country as garden-plants on account of their use as purges and their peculiar foliage, have run wild in many places. Three years ago we discovered in Vestal, N. Y., two large patches of the Mediterranean *E. Nicœnsis* (not before reported in this country); it still grows there, and is spreading luxuriantly as if thoroughly satisfied with its new home. *E. cyparissias* has escaped in many places in Broome County, N. Y., and flourishes finely wherever it grows.

The Caper Spurge is the *Cataputia minor* of old pharmacopœias, and is one of the plants that Charlemagne ordered grown in every garden in France. The laity in England are said to use one capsule to cause catharsis, and the women, several to produce abortion. The oil of the seeds was probably first used by Calderini, in doses of from six to eight drops, as a cathartic; he was followed by Gounaud, and later by Bally; Frank suggested* its employment in ascites, hysteralgia, and tænia. Mr. Scattergood† tells us that the manufacturer of the oil at Crosswick, N. J., claimed small doses, repeated if necessary at hourly intervals, act as a pleasant cathartic; but says that in his own experiments doses of from six to twelve drops invariably produced nausea and vomiting. The bark of the root has been found to produce emesis and catharsis. Rafinesque states that the pickling of the capsules as a substitute for capers in England was due to mistaking them for *Capparis spinosa*, the true caper; other authors, however, claim that the use of the fruit in this manner is intentional, and that the substitution is a passable one.

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* *Jour. de Phar.*, xi, 273.

† *Phil. Jour. Phar.*, 1833, 124.

PART USED AND PREPARATION.—The whole plant, when half is in fruit, is treated as in the preceding species. The resulting tincture is bistre by transmitted light; it has an odor somewhat resembling spoiled oysters; a sweetish then bitterish, nauseous taste; and an acid reaction.

CHEMICAL CONSTITUENTS.—No analysis has yet been made of this species that isolated an active principle. The seeds are said to yield about 44 per cent. of a clear, yellowish, heavy oil, that deposits a crystalline mass on standing. The activity of the oil seems to vary much with the locality in which the plant grows, it being far more active from seeds produced in this country than from those of England or France.

PHYSIOLOGICAL ACTION.—The following symptoms occur after ingestion of a number of the seeds: Brilliant, staring, wide-open eyes, dilated pupils; death-like pallor of the countenance; retching and vomiting; violent purgation, stools frequent, copious, and in some cases bloody; irregular pulse; whole body cold and rigid,* followed by heat and perspiration. MM. E. Sudour and A. Caraven-Cachin state† that emesis always precedes purgation, and that the seeds have an irritating action upon the mucous membrane of the intestinal canal, principally in the larger intestines. They divide the effects into three stages: α, the cold stage, including vomiting and diarrhœa; β, the stage of excitation, including nervousness, vertigo, and delirium; γ, the stage of reaction, including heat and copious sweat.

Description of Plate 150.

1. A portion of the inflorescence in flower and fruit, from near a garden, Sept. 27th, 1885.
2. Summit of stem at the base of the inflorescence.
3. Involucre and contents.
4. Outer view of an involucral lobe.
5. Inner view of same.
6. Abortive stamen.
7. Sterile floret.
8. A stamen.
9. Fruit.
10. Under surface of a capsule separated from the axis.
11. A carpel.
12. Longitudinal section of a seed.
13. Horizontal section of a seed.

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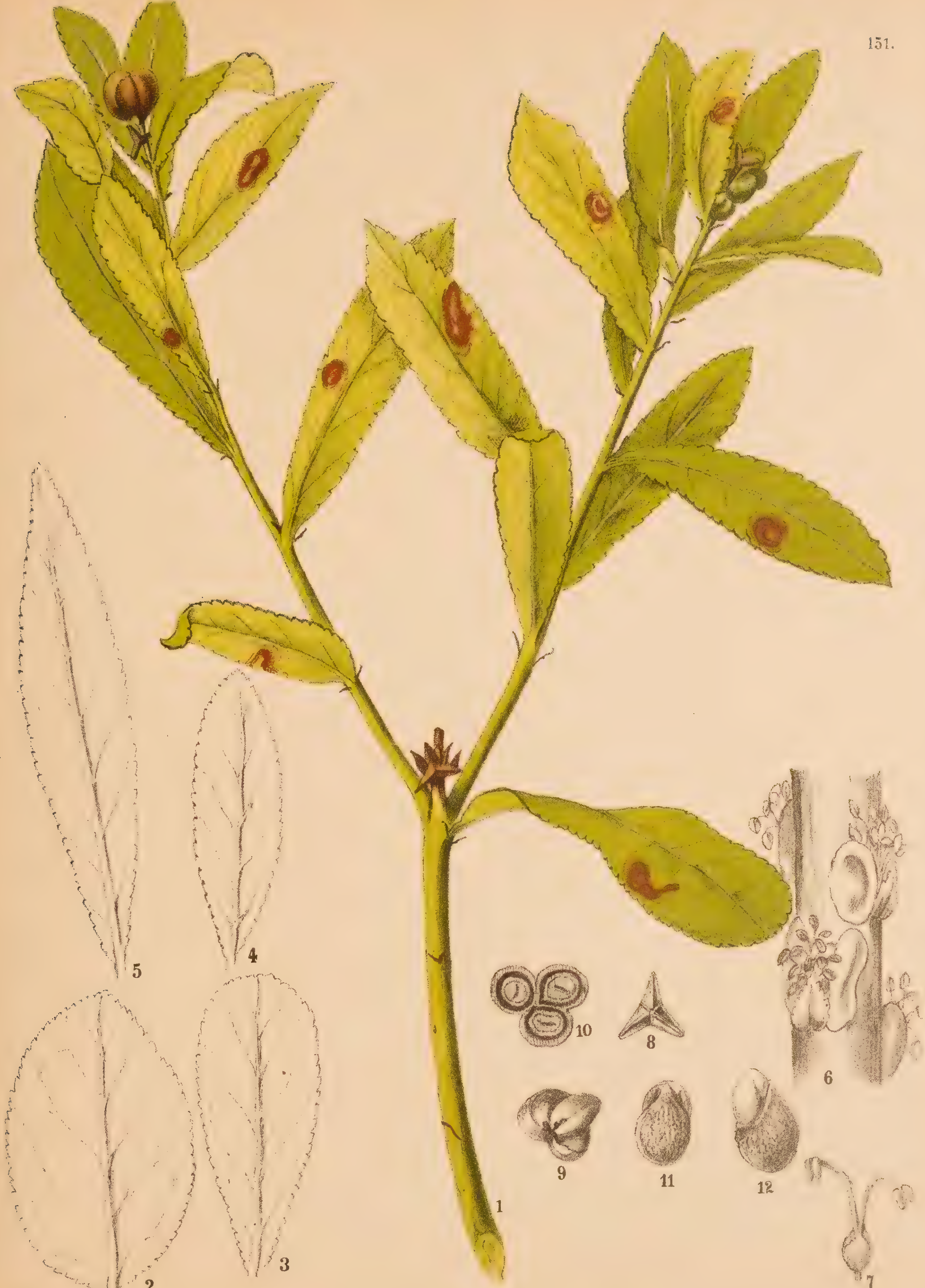
* Bennewitz, *A. H. Z.*, 7, 257: Jacob, *Am. J. Med. Sc.*, Jan., 1845; *Phar. Jour.*, 1861, 435; from Allen, *Ency. Mat. Med.*

† *Rep. de Phar.*, 1881, pp. 526–7; Maisch, in *A. J. Phar.*, 1882, p. 72.



C.F.M. ad nat del. et pinxt.

STILLÍNGIA SYLVÁTICA, Linn.

GENUS.—**STILLINGIA,*** GARDEN.

SEX. SYST.—MONŒCIA MONADELPHIA.

STILLINGIA.

QUEEN'S DELIGHT.

SYN.—STILLINGIA SYLVATICA, LINN.; SAPIUM SYLVATICUM, TORREY.
COM. NAMES.—QUEEN'S DELIGHT, YAW-ROOT, MARCORY, COCKUP-HAT, QUEEN'S ROOT; (FR., GER.) STILLINGIE.

A TINCTURE OF THE ROOT OF STILLINGIA SYLVATICA, LINN.

Description.—This herbaceous perennial grows to a height of from 1 to 3 feet. *Stems* clustered, glabrous, upright, and umbellately branched; *juice* milky; *root* cylindraceous, thick and ligneous, extensively creeping. *Leaves* alternate, crowded, almost sessile, varying in form, from ovate and obovate, to oblong and lanceolate, all thick and fleshy, and acute at the tip; *margin* crenate-serrulate, with a gland in each serrature; *stipules* minute, setaceous. *Inflorescence* a dense, terminal, monœcious spike; *flowers* destitute of petals or disk-glands. *Sterile flowers* in dense clusters of 5 to 10, arranged about the spike for nearly its whole extent, each cluster in the axil of a deltoid, scarious-margined, acute bract, and laterally enclosed by two peculiar scutellate glands attached to the rachis by their centres; *calyx* cup-shaped, membranaceous, with a 2-cleft margin, the divisions imbricated in the bud; *stamens* 2, greatly exserted; *filaments* filiform, attached for nearly half their length below; *anthers* erect, 2-lobed, adnate and extrorse. *Fertile flowers* few, situated at the base of the spike in the axils of bracts similar to those of the sterile flowers; *calyx* 3-lobed; *style* thick, articulated below, *stigmas* 3, simple, diverging. *Fruit* a roundish, roughish capsule, composed of 3 1-celled, 1-seeded, 2-valved, carpels; *seeds* globose, roughish, caruncolate.

History and Habitat.—Stillingia is indigenous to the United States, where it grows in light, sandy and dry soil, from East Virginia southward to Florida, and westward to Louisiana and Texas, flowering from April to September.

For many years before its introduction in medicine, by Dr. T. Y. Symons,† as an alterative in syphilis, it had been used in the South, by the laity, as an emetic, cathartic, and alterative; indeed it was and is still considered, in Southern States, an absolute specific in syphilis, entirely superseding the use of mercury. It was also used as an expectorant in pulmonary disorders; a purgative in hepatic troubles; an alterative in scrofulosis; and was said to greatly add to the usefulness of sarsaparilla. Dr. Porcher says:‡ "This plant exudes a milky juice, very pungent to the taste, and flowing in great abundance from the bruised surface. It is used to some extent in this State (South Carolina) as an alterative in scrofula, in syphilis, in cutaneous diseases, in chronic hepatic affections, and in the composition of diet drinks. We are informed by a physician residing in this State that he has treated syphilis successfully with it. It is believed to be possessed of valuable properties, and greater attention should be paid to it by those living in the country, where it is easily obtained. A tincture is made with the root two ounces, diluted alcohol a pint. Dose, a fluid drachm. A decoction is made of the bruised root one ounce, water one and one-quarter pints; boil to one pint. Dose, one or two fluid ounces several times a day." The use of the drug in the North has not been as successful as it might have been, as the active properties of the plant deteriorate in aged roots or preparations. It is said that a drop of the oil of the plant placed upon the tongue, four times a day, has proved successful in severe croup.

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* In honor of Benjamin Stillingfleet, M.D. † *Am. Med. Rec.*, 1828, 312. ‡ *Resources Southern Field and Forest*, 121

The officinal preparation in the U. S. Ph., is *Extractum Stillingiæ Fluidum* from the root; in the Eclectic Materia Medica the following preparations are recommended: *Extractum Stillingiæ Alcoholicum*, *Extractum Stillingiæ Fluidum; Linimentum Stillingiæ Compositum*;* *Pilulæ Phytolaccæ Compositæ*;† *Syrupus Stillingiæ; Tinctura Stillingiæ; Syrupus Stillingiæ Compositus*.‡

PART USED AND PREPARATION.—The fresh root, gathered after the fruiting season, is treated as all Euphorbiaceous roots.§ The resulting tincture is nearly opaque; by transmitted light, in thin layers, it has a brilliant crimson color. It retains the odor and taste of the root; is quite astringent; and has an acid reaction.

CHEMICAL CONSTITUENTS.—*Stillingine.*—Harmanson‖ (1882) procured the sulphate of an alkaloid, for which, after special isolation, Bichy (1885) proposed the above name; very little, however, is known of the body. Bichy describes it as follows: "An amorphous powder, entirely volatilizing by heat, whose sulphate exists as fine scale-like crystals."¶

Oil of Stillingia.—The only product that I have examined, claimed to be this body, was certainly not a pure oil, but appeared like a resinous oily mixture; it had a burning, acrid, slightly bitter, and astringent taste, and the odor of the root; it was of a deep brown color, and contained brownish particles insoluble in water and alcohol. On adding it to water a resin was precipitated. Alcohol dissolved all but the particles mentioned. The root, however, does contain both a fixed and a volatile oil, as shown by Harmanson and Bichy.

The root also contains gum, starch, and coloring-matter.

PHYSIOLOGICAL ACTION.—Stillingia, in generous doses, causes the following disturbances in the system: Depression of spirits; vertigo; burning, smarting, and stinging in the mouth, fauces, and stomach; nausea and vomiting; diarrhœa attended with colic and burning tenesmus; bilious and dysenteric stools; increased urine attended with burning along the urethra; short, hacking, dry, and spasmodic cough; weak, irregular pulse; aching and sharp pains of a rheumatoid character in the arms and legs; burning itching of the skin, followed by a general herpetic eruption; languor; sleepiness; perspiration; and a general feeling of malaise.

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* Page 99-2.

† Page 139-2.

‡ Stillingia Root, Corydalis Root, Iris Root, Sambucus Flowers, Chimaphila Leaves, Coriander Seeds, and Xanthoxylum Berries.

§ Page 147-2.

‖ *Am. Jour. Phar.*, 1882, 386.

¶ *Am. Jour. Phar.*, 1885, 530.

DESCRIPTION OF PLATE 151.

1. End of a fruiting branch, from which most of the ripe fruits have fallen. St. Augustine, Fla., Aug. 21st, 1886.

2, 3, 4 and 5. Leaf-forms.

6. A portion of the male inflorescence.

7. A male flower.

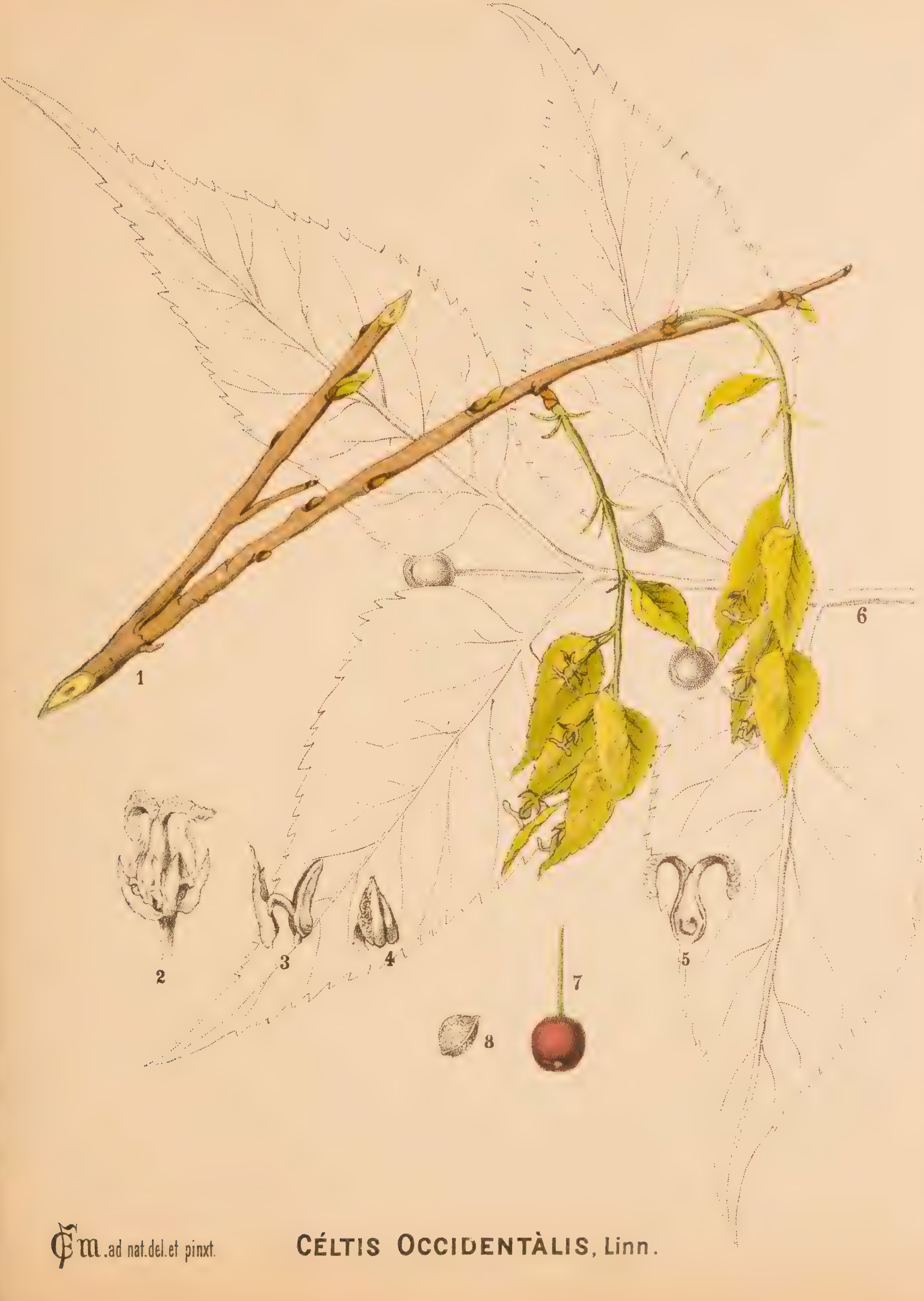
8. A fruiting calyx.

9. Fruit.

10. Horizontal section of fruit.

11 and 12. Seeds.

(6-12 enlarged.)



CEm.ad nat.del.et pinxt.

CÉLTIS OCCIDENTÀLIS, Linn.

S. ORD.—ULMACEÆ.
GENUS.—**CELTIS**,* LINN.
SEX. SYST.—POLYGAMIA MONŒCIA.

CELTIS.

HACKBERRY.

SYN.—CELTIS OCCIDENTALIS, LINN.; C. AUDIBERTIANA, SPACH.
COM. NAMES.—HACKBERRY TREE, AMERICAN NETTLE TREE, SUGARBERRY, BEAVER-WOOD; (FR.) SUCRÉ BAIE; (GER.) ZUCKERBEERE.

A TINCTURE OF THE FRESH INNER BARK OF CELTIS OCCIDENTALIS, L.

Description.—This medium-sized tree grows to a height of 30 to 50 feet. *Trunk* very straight, about 8 or 10 inches in diameter; *wood* soft; *bark* very rough and corky, easily detached. *Leaves* petiolate, reticulated, ovate or ovate-lanceolate, smooth and scabrous above, downy pubescent beneath; *base* oblique or sometimes cordate; *margin* sharply, and plentifully or sparingly serrate, especially toward the tip, at the base often entire; *stipules*, caducous. *Inflorescence* monœciously polygamous, somewhat racemose along the upper shoots of the season. *Flowers* appearing with the leaves and before they are developed; *sterile* flowers grouped in twos and threes along the lower and leafless portion of the young shoots; *fertile* or polygamous flowers racemosely arranged at the leafy end of the shoot, the peduncles in the axils. *Calyx* 5-6 parted, persistent in the female; *lobes* more or less ovate-lanceolate, acute. *Stamens*, as many as the lobes of the calyx and opposite them; *filaments* curved inward and downward, inserted at the base of the calyx lobes; *anthers* large, sagittate, versatile and introrse, two-celled, with a longitudinal dehiscence. *Ovary* 1-celled; *ovule* anatropous; *stigmas* 2, sessile or nearly so, being in fact merely two lobes of the style divergently spreading and stigmatose upon the inner (now upper) surface. *Fruit* a dark purple, sweet and edible, globular drupe, of about the same appearance and size as a wild cherry; *peduncles* about twice the length of the petioles; *exocarp* coriaceous, divided into two equal parts by a prominent, circumvallating ridge. *Nutlet* spherical, about the size of a cherry-stone, pointed at the end and divided into four equal, rugose, portions by as many prominent ribs; *embryo* curved, almost completely enclosing the gelatinous albumen.

Urticaceæ.—This large family, now including the Ulmaceæ, Artocarpeæ and Cannabineæ, consists of trees furnished with a milky juice, and shrubs and herbs having a watery juice, inhabiting principally the warmer portions of the globe. *Stems* and *leaves* various, many furnished either with stings or rigid hairs; *stipules* persistent, caducous or wanting. *Inflorescence* spicate, amentaceous, racemose or capitate; flowers monœcious, diœcious or polygamous. *Calyx* regular. *Corolla* none. *Stamens* definite, as many as the calyx lobes, and opposite them, or fewer. *Ovary* simple, free from the calyx, 1-celled, rarely 2-celled; *ovules* 1 to each cell, anatropous or orthotropous; *styles* single, or two-lobed at the apex, the lobes stigmatose. *Fruit* an achenium, samara, urticle, or often rendered baccate by the persistent and now fleshy calyx. *Albumen* not always present; *radicle* pointing upward.

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* The ancient Greek name for the *Lotus-berry*, the fruit of the *Lote* (*C. australis*, Linn.), supposed to have been the food of the *Lotophagi*. (See, however, under Leguminosæ, p. 4–62.)

The sub-order ULMACEÆ, or Elm Family, furnishes us this remedy only; the other species used in medicine are: The East Indian *Celtis orientalis*, formerly used in epilepsy; and the European Lote Berry Tree (*C. australis*, Linn.), the bark of which is astringent, and is used in gonorrhœa and dysentery. The European *Ulmus campestris*, Linn., is considered to be diuretic as well as an astringent tonic; *U. effusa*, Willd., was at one time used as a substitute for sarsaparilla; and the American Slippery Elm (*U. fulva*, Michx.) is a well-known demulcent, and anti-herpetic, and is considered by many anti-syphilitic.

The sub-order ARTOCARPEÆ or Bread Fruit Family, yields several esculent fruits, while many of its members afford highly poisonous juices, and some a nourishing milk. The South Sea Island Bread Fruit is a product of *Artocarpus incisa*, and the Jack Fruit of *A. integrifolia*. The South American Cow Tree, so aptly named on account of the nourishing milky juice that freely exhudes from the wounded trunk, is a species of *Bromisum*, and the Jamaica Bread Nuts are the fruits of *B. alicastrum*. The Asiatic Fig, the fruit of *Ficus carica*, Linn., of this sub-order, highly esteemed in all countries as a laxative dessert fruit, is also useful, when roasted, as an application to hasten suppuration in small circumscribed formations of pus; the bark of the East Indian Banyan Tree (*F. Indica*, Linn.), whose immense growth is famous, is used by the Hindoos as a tonic and anti-diabetic; it also yields a gum known as Gum Lac, and a juice useful as an application for aching teeth; the Indian India-rubber Tree (*F. elastica*, Roxb.) and the South American *F. radula*, *elliptica*, and *prinoides*, yield a fine quality of caoutchouc; the East Indian *F. racemosa*, Linn., yields a bark that is a powerful tonic, useful in hematuria and menorrhagia; the wood of the African *F. sycamorus* is imperishable, and was used by the ancient Egyptians for mummy cases; *F. septica* is emetic, and the Indian *F. dæmona*, Vahl., and *toxicaria*, Linn., yield extremely virulent juices. The Brazilian *Caapeba*, or *Caa-apia*, a product of *Dorstenia Braziliensis*, Linn., the Mexican *D. contrayerva*, Linn., and *D. Houstoni*, Miller, are all supposed to contribute more or less to the commercial *Contrayerva*, which is a gentle stimulant, diaphoretic, and nervine, as well as an alexipharmic, and has, in a great measure, supplanted serpentaria. *Cecropia peltata* is astringent and was once much valued in the treatment of chronic intestinal catarrh, and *Musanga cecropioides*, a powerful emmenagogue. The Mulberries, including the Levantine Morus Nigra, the American *M. rubra*, and the Chinese *M. alba*, yield edible fruits, while their barks are considered cathartic and anthelmintic; Fustic is the bark of *M.* tinctoria. In concluding this varied sub-order, we are brought to that terrible Javanese tree, the deadly Upas (*Antiaris toxicaria*, Lesch.), under which most animals die; the toxic properties of this tree are, without doubt, greatly exaggerated, as all are not effected by its effluvia, still it is justly dreaded.

The sub-order URTICEÆ, or Nettle Family, contains many plants that are furnished with more or less toxic stings. Of this order we have provings of three species, viz.: The European Stinging Nettle, *Urtica Urens*, Linn.; the Bengalese *U. crenulata*, Roxb., whose sting is said to be as poisonous as the bite of a venomous serpent; and the Australian Stinging-Tree (*U. gigas*). The Timoor *U. urentissa* is probably the most virulent, its effects are said to last a year, and in some cases to have been followed by death; the Javanese *U. stimulans* is also very venomous. Our common nettle *U. dioica* is diuretic and astringent; the Egyptian *U. membranacea* emmenagogue and aphrodisiac; and it is claimed that the smooth species *U. pumila* relieves inflammation, erysipelas, and is a soothing application to the skin after Rhus poisoning. The Brazilian *Boehmeria caudata*, Swartz, is useful for the relief of hemorrhoidal tumors; and *Pilea muscosa*, of the same country, is found to be an excellent remedy in dysuria. *Parietaria officinalis* is considered diuretic and anti-arthritic; and *P. erecta* and *diffusa* are said to contain more sulphur than any other known plants.

The sub-order CANNABINEÆ, or Hemp Family, contains our proven species, *Cannabis sativa* and *Humulus Lupulus.*

History and Habitat.—The hackberry tree is indigenous to the Canadas and United States, as far south as the Carolinas. It habits more or less rich but rocky woods along the borders of streams, where it flowers just as the leaves appear in spring. It is often transplanted as a lawn shade, in such open situations it is much shorter in its growth and more umbrageous.

The only previous use of this species is that credited to the Aborigines, who are said to have given a decoction of the bark with good effect in syphilis. This decoction being astringent, was sufficient for its employment by the laity and Botanics as a "tonic" in various forms of alimentary and hematic trouble, though success in its use was of doubtful occurrence.

PART USED AND PREPARATION.—The fresh inner bark should be gathered when the tree is in full foliage, chopped and pounded to a pulp, and weighed. Then two parts by weight of alcohol should be taken, the pulp thoroughly mixed with one-sixth part of it, and the rest of the alcohol added. The whole is then to be poured into a well-stoppered bottle, and allowed to stand for eight days in a dark, cool place. The tincture, separated from this mass by decanting, pressing, and filtering, will have a deep, seal-brown color by transmitted light, and a strong acid reaction. This preparation has neither a distinctive odor nor taste.

PHYSIOLOGICAL ACTION.—Dr. J. S. Wright, in his experiments with this drug,* found it capable of causing a soreness of the muscles on pressure; sharp pains through the lungs; aching in the bones; swelling of the face, and afterwards of the whole body, with turgid blood-vessels; and sharp stitching pains generally throughout the system.

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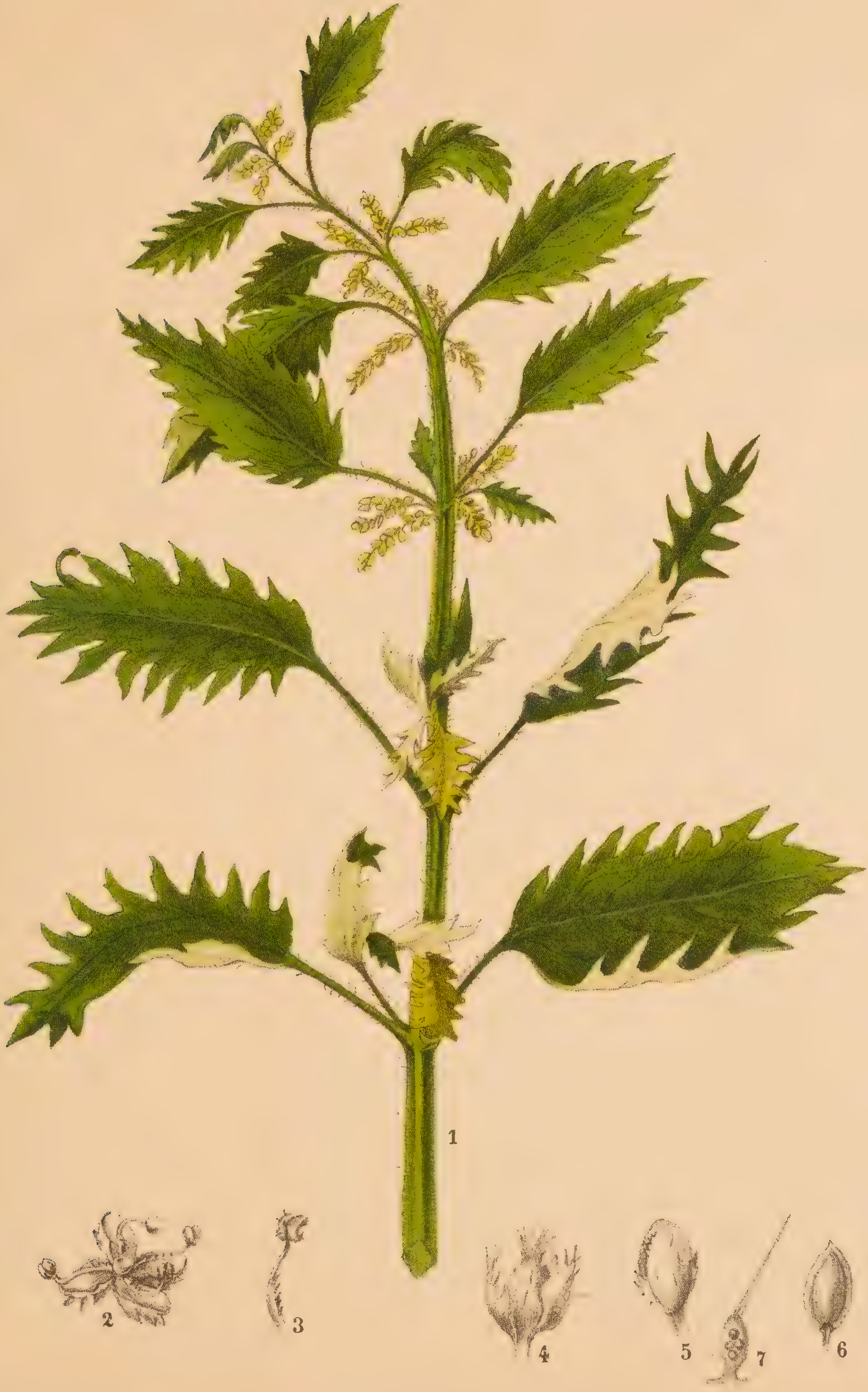
* *U. S. Med. Invest.*, 1879, 339.

Description of Plate 152.

1. End of flowering branch, the fruiting female flowers alone showing, Binghamton, N.Y., May 17, 1885.
2. A polygamous flower.
3. Stamen and calyx lobe.
4. Anther, showing dehiscence.
5. Section of pistil.
6. End of branch in fruit.
7. A fruit.
8. Seed.

(2–5 enlarged.)



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URTÌCA ÙRENS, Linn.

Tribe.—URTICEÆ.

GENUS.—**URTICA**,* TOURN.

SEX. SYST.—MONŒCIA TETRANDRIA.

URTICA URENS.

STINGING NETTLE.

SYN.—URTICA URENS, LINN.; U. DIOICA, HUDS. (NOT LINN.).
COM. NAMES.—STINGING NETTLE, DWARF NETTLE,; (FR.) L'ORTIE; (GER.) BRENN-NESSEL.

A TINCTURE OF THE WHOLE PLANT URTICA URENS, LINN.

Description.—This stinging annual, grows to a height of from 1 to 2 feet. *Stem* erect, 4-angled and branching; *bark* tough and fibrous; *stings* sparse but very virulent. *Leaves* opposite, elliptical or ovate, petiolate, 5-nerved, and furnished with a few scattered stings; *margin* deeply serrate, with long, spreading, and more or less blunt teeth; *base* truncate or sometimes slightly cordate; *stipules*, distinct, lanceolate, reflexed. *Inflorescence* in loose, axillary, drooping, racemose spikes, 2 in each axil; *flowers* androgynous. *Sterile flowers: sepals* 4; *stamens* 4, inserted around the rudimentary pistil; *filaments* transversely wrinkled and inflexed in the bud, spreading elastically when the flower opens. *Fertile flowers: sepals* 4, in pairs; the two outer small and spreading, the two inner concave, in fruit membranaceous and enclosing the akenium; *stigma* sessile, capitate, and penicillate; *ovary* 1-celled; *ovule* erect, orthotropous. *Fruit* a straight, erect, ovate, flattened, shining akene; *embryo* straight, axial; *albumen* present.

History and Habitat.—This European immigrant has established itself in many places eastward and southward near the coast, in damp, waste grounds, where it flowers in July and August.

The most ancient use of the Nettle is flagellation or urtication, a practice of whipping paralyzed limbs, to bring the muscles into action. This practice extended also to a stimulation of impotent organs, and to bring into action dormant energies. It was also resorted to in apoplexy, general cerebral and portal congestion, to bring the blood to the surface and thus relieve the more vital organs; in exanthematous fevers, to bring out the eruption; and for various affections where a powerful rubefacient was considered necessary.

The Nettle was afterward found to be styptic and anti-hemorrhagic, both topically and internally, and proved itself very beneficial in menorrhagic, epistaxic, and post-partum hemorrhage, hematemesis, and hematuria. Their decoction was found to be diuretic, and thus beneficial, in urinary calculus, scurvy, dropsy, gout, jaundice, etc.

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* Latin, *uro*, to burn.

The seeds were given in goitre, corpulence, glandular enlargements and scrofulosis, and were also considered anthelmintic and hypnotic; while verrucæ were said to entirely disappear in a fortnight, under daily application of the juice.

The young shoots are considered excellent "greens," on their appearance in spring; and in Russia and Siberia, the stalks afford a tough fiber, not inferior to hemp for the manufacture of cloth, paper, nets, and ropes. A strong decoction of the plant, salted, is said to coagulate milk very quickly, and the product to prove devoid of any unpleasant taste.

PART USED AND PREPARATION.—The whole fresh plant is treated as in the preceding drug (page 152–3). The resulting tincture has a deep brown color by transmitted light; an odor resembling chocolate; an astringent herbaceous taste; and an acid reaction.

CHEMICAL CONSTITUENTS.—*Formic Acid*, H_2CO_2. This volatile acid is found in a free state in the stings of this species; it is also found in the poison-bags of the red ant, the hairs of a species of caterpillar (*Bombyx processionea*), in pine needles, turpentine, and in many plants. Formic Acid was first obtained by Samuel Fisher, by distilling red ants, since which time it has been proven quite widely distributed. When pure, this acid is a colorless liquid, solidifying at +1° (33.8° F.), in the form of shining plates, and boiling at 100° (212° F.). It possesses a sour, pungent odor, something like acetic acid, a very acid taste, and is so corrosive to the skin that its blisters are very like those resulting from burns. It is freely soluble in both water and alcohol, as are also its salts.

As the effect of Nettle stinging differs considerably from that of Formic Acid, and as the distillate of the plant savors of ammonia, as well as of carbonic dioxide, another principle, alkaloidal in its nature, will probably be found in the species.

PHYSIOLOGICAL ACTION.—The following case of poisoning, by two cupfuls of a hot infusion of two ounces of the herb,* shows well the action of this drug; The skin of the face, arms, shoulders, and chest, was affected with extremely distressing, burning heat, with formication, numbness, and violent itching. The lips, nose, and ears were swollen, and the lids swollen and œdematous, so that they could scarcely be opened. After a while all the upper parts of the body, down to the navel, were frightfully swollen, pale and œdematous, rather than inflamed. A large number of small transparent blisters, filled with serum and looking like sudamina, developed and became confluent; on account of these the skin assumed a peculiar wrinkled appearance. There was no other remarkable disturbance, either of circulation or respiration. The patient complained neither of headache, nor of sensitiveness of the stomach and abdomen. The look of the patient was monstrous, the lids completely closed, forming transparent, and here and there bluish swellings, as large as hen's eggs. The upper lip, nose, and both ears were frightfully swollen. On the third day the face became free, but the chest and arms remained affected with an eruption, which itched so violently that the patient scratched off the blisters, which exuded a large amount of serum. The woman, who had had no children for three years and a half, and had nursed none of her children, had at first excessive swellings of the breasts, which discharged at first serum, afterwards perfect milk; a very copious secretion of milk lasted for eight days. The secretion of urine was at first suppressed, and in spite of all diuretics and other remedies, not a single drop was secreted for eight days. During the whole illness there was a constant distressing itching. On the sixth day everything disappeared, with desquamation.

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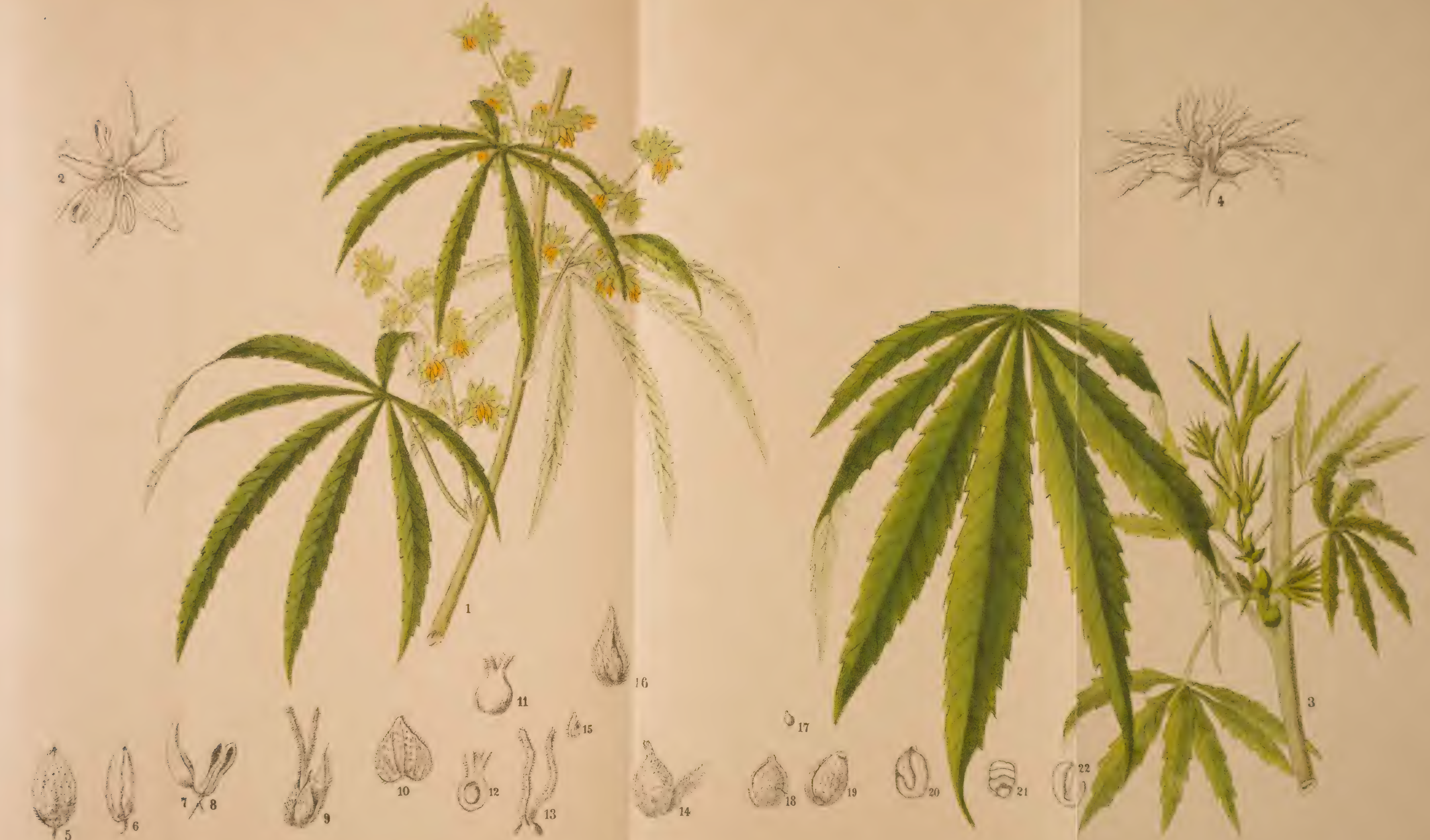
* Dr. Fiard, Acad. de Med., Paris, *A. H. Z.*, 8, 81, Allen, *Ency. Mat. Med.*, x, 49.

DESCRIPTION OF PLATE 153.

1 Top of a flowering plant, Salem, Mass., July 8th, 1885.
2. Male flower.
3. Stamen.
4. Female flower.
5. Fruit, with calyx.
6. Seed.
7. Sting.
(2–7 enlarged.)



F.M. ad nat del. et pinxt.

CÁNNABIS. SATÌVA, Linn.

N. ORD.—URTICACEÆ.

Tribe.—CANNABINEÆ.

GENUS.—**CANNABIS**,[*] TOURN.

SEX. SYST.—DIŒCIA PENTANDRIA.

CANNABIS.

HEMP.

SYN.—CANNABIS SATIVA, LINN.; CANNABIS INDICA, LAM.
COM. NAMES.—INDIAN HEMP; (FR.) CHANVRE; (GER.) HANF.

A TINCTURE OF THE TOPS OF AMERICAN-GROWN CANNABIS SATIVA, LINN.

Description.—This tall, roughish annual, usually grows from 3 to 10 feet high. *Stem* erect, striate, roughish, ligneous at the base, simple or sparingly branched; *inner bark* tough and fibrous. *Leaves* digitately-compound, the lower opposite, the upper alternate; *leaflets* 3-5-7, linear-lanceolate, coarsely and sharply serrate, attenuate at both ends; finely scabrous, and dark-green above, pale and downy beneath; *petioles* long, slender, and scabrous; *stipules* linear, acute. *Inflorescence* diœcious. *Sterile flowers* in axillary compound racemes, or panicles; *sepals* 5, nearly separate, reflexed-spreading, nearly equal, oblong and downy; *stamens* 5, opposite the segments of the calyx; *filaments* short, drooping, not inflexed in the bud; *anthers* large, pendulous, 2-celled. *Fertile flowers* in axillary, spiked clusters, leafy below; *flowers* 1-bracted and sessile; *calyx* of a single, 5-veined, hirsute sepal, enlarging and cordate at the base, acute at the apex; *ovary* 1-celled; *ovule* single, erect, orthotropous; *style* not evident; *stigmas* 2, elongated, hairy, protruding far beyond the perianth. *Fruit* a glandular achenium, enwrapped by the persistent sepal; *pericarp* membranaceous, indehiscent, but easily separable by pressure into two valves. *Seed* ovoid, smooth, brown, and veiny; *embryo* simply curved; *albumen* slight, oleaginous.

History and Habitat.—This native of the temperate portions of Asia—a plant of ancient cultivation—grows readily in this country, in waste places and cultivated grounds, where the cleanings of bird cages have found their way. It thrives well,[†] blossoming in July and August.

The plant in its travels westward is supposed to have reached Italy during the Roman period, from whence it has spread in all temperate regions of the globe. It does not seem to have been known to the ancient Egyptians as having narcotic properties. Herodotus terms the plant Κάνναβις ημερος, stating that the Thracians made a kind of cloth of it. The seeds were also thrown upon red-hot stones, and their perfumed vapor, so obtained, used for a fume bath, which excited from those enjoying it, cries of exultation. Dr. Royle considers it the Nepenthes of Homer, "the assuager of grief," given by Helen to Telemachus in honor of Menelaus; she is said to have received the plant from an Egyptian woman of Thebes. Dioscorides recommends the herb in the form of a cataplasm for inflammations, and to discuss tumors. Paulus Ægineta says the seeds are carminative and desiccative, and the juice of the fresh plant useful for pain and obstructions of the ears. In India, the plant is known by names which translated mean, "Grass of Fakirs," "Leaf of Delusion," "Increaser of Pleasure," "Exciter of Desire," "Laughter Mover," and "Cementer of Friendship."

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[*] Κάνναβις, *Kannabis;* an Oriental name of unknown meaning, probably, however, derived from the Arabian name of the plant *ganeb.*

[†] A thrifty female plant, nine feet high, grew last year in a farm-house yard near Binghamton; and several of both sexes, fully seven feet, at Union, N. Y.

The true Indian Hemp, *i. e.*, that which contains to the fullest extent the narcotic properties of the herb, grows at altitudes of 6000 feet and over, principally in the Himalayas above Calcutta, and in Thibet. These plants differ in nowise botanically from those that grow at lower levels, but medically the variation is wide. It is certainly admissible here to mention the products of the more active form which, for convenience, we will retain as *Cannabis Indica.* The principal commercial form of the Indian plant is called *Gunjah, Ganja,* or in England *Guaza.* It is this form that reaches the American markets through London, and from which our tincture of *C. Indica* should be made. It consists, according to a fine specimen kindly given us by Shifflein & Co., of New York, of the dried, flowering tops, compressed into small, ovoid masses, cohering by the natural resin contained, and composed of small floral leaves, female flowers, and undeveloped seed. Each separate mass exhales a small portion of the stemlet upon which it grew, and exhales to a high degree the odor peculiar to the plant. This *Gunja* yields an excellent extract, which, when at a temperature of 65° F., is thick, and only runs when held a long time at a sharp angle; it is of so dark a green color as to appear jet black; has a strongly narcotic, peculiar, and not unpleasant odor; is very adhesive, insoluble in water, and fully soluble in alcohol, its solution having a brilliant green color. When placed upon the tongue no taste is at first noticed on account of its very slow solubility in the natural secretions of the mouth, but after a few moments the taste is a counterpart of the odor, and when the solution reaches the base of the tongue an agreeable bitter is notable. This extract was formerly used for our tincture. Other forms of the plant sold in India and Arabia are, α. Bhang, Subjee, or Sidhee, which consists of the dried leaves broken into coarse powder with which are intermixed a few seeds. This form is used for smoking, and is the narcotic ingredient of the confection called *Majun.* *β. Charas,* or *Churrus,* consisting of the natural resin of the tops and leaves, mixed with bits of the plant and much dirt. This form is usually procured by natives who pass among the plants, wearing a leathern apron to which the resin adheres; in the mean time the plant tops are rubbed with their hands, and afterward the hands and aprons scraped to gather the product. *γ. Hashisch, Hashish,* or *Hashash.* These are the Arabian names for hemp. The product consists of the dried flowering tops gathered before the fruits are formed. The famous heretical sect of Mohammedans, who, by murderous attacks upon the Crusaders, struck their hearts with terror, derived their name *Hashashin* from the drug, and from that our word *assassin* is derived. δ. *Hemp.* This textile is produced principally by those plants whose narcotic powers are least marked; those that grow in the lower altitudes producing the best article. This product is made into ropes and coarse cloths. ε. *Hemp Seed.* The seeds of this plant are considered fattening, and egg-producing when fed to birds. Cage-birds are particularly fond of them, but on account of their limited chances for exercise only a few *per diem* are usually allowed them. ζ. *Oil of Hemp Seed.* The seeds yield about 25 per cent. of their weight of a limpid, almost colorless oil, that makes a fine burning-fluid, and is used in the arts for mixing colors, and as a varnish.

In general practice the drug is used wherever an anodyne, hypnotic, or antispasmodic is judged necessary; the various diseases where it proves effectual are hardly mentionable, as the benefit is almost always homœopathic, therefore, each disease should be individualized. Surgical tetanus, gonorrhœa, leucorrhœa, inflammation of the mucous membranes of the bladder and urethra, dysuria, delirium, and melancholia may be, however, mentioned as the diseases in which our Old School brothers usually get the most decided effects from this drug.

Cannabis Americana, i. e. the tops of American-grown plants, are officinal in the U. S. Ph. The plant is mentioned in the Eclectic Dispensatory, but no preparation is given.

PART USED AND PREPARATION.—The fresh flowering tops of the American-grown plants, both male and female, are treated as directed under Celtis.* The tincture, after straining and filtering, is opaque; has an herbaceous odor; a sweetish mucoid taste, followed by slight bitterness; and an acid reaction. The two tinctures of this plant may be compared as follows:

CANNABIS SATIVA.

Americana.	*Indica.*
Domestic Growth.	Indian Growth at 6000 Feet.
Tincture.	*Tincture.*
Appearance, in bulk, deep opaque brown.	Deep opaque greenish-brown.
Twenty drops in a drachm of alcohol give an orange-brown color by transmitted light.	A slight greenish tinge only is noticeable; the two solutions nearly correspond.
Ten drops in two drachms of water quickly show the difference in the amount of resin.	
This tincture shows only slight opalescence; while	this gives a completely opaque, heavy, dirty cream-colored mass.
In this tincture the peculiar pungent and heavy narcotic odor of *Gunja* is faintly, if at all, noticeable.	In this the odor is plainly distinguishable.

As the narcotic power of the drug lies mostly in the resin of the plant, the activity of the two states of the plant is readily understood by the above comparison, simple as it is.

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* Page 152-3.

CHEMICAL CONSTITUENTS.—As far as I can determine, the American plant has not been analyzed, but as it at least contains a small amount of the resinoid principle of the Indian plant, it may be well to glance at the chemistry of *Gunja*, as it stands at this date. There is great uncertainty concerning the active principle of this drug, as the *Cannabin* of the Smiths fails, so far, to answer, at the hands of other chemists, to the characteristics claimed for it by them. Worden and Waddle find the nicotia-like alkaloid of Preobraschersky, but in their hands it proves inert; and, though Siebold and Bradbury found a volatile alkaloid (*Cannabinine*), they claim that it is unlike nicotia, though they have not tested its action upon animals. Merck isolated a glucoside, which he combines with tannin and calls *Cannabin Tannin*, and from which Bombelon obtained a body he terms *Cannabinum;* this tannin compound often proves inert. Matthew Hay reports an alkaloid, forming in acicular crystals, and having a tetanic action upon frogs, which he calls *Tetano-Cannabin*, and considers as a secondary principle.* This is about the condition of the chemistry of this drug to-day; which the following digest will farther explain:

Cannabin.—This body, extracted from Gunja, by Messrs. T. and H. Smith,† and considered much purer than Gastinel's *Hashascin*, results as a brown, amorphous, solid resin, which burns with a bright flame, leaving no ash, and is soluble in alcohol and ether. It is claimed, by its discoverers, to be very potent, two-thirds of a grain proving decidedly narcotic, and one grain causing complete intoxication. Personne claims that the activity of this body is due to the volatile oil, but his method of extracting the body was sufficient to render it inert, rendering his claim, therefore, inadmissible. Bolas and Francis‡ obtained from this body:

Oxycannabin, $C_{20}H_{20}N_2O_7$, which resulted in large, neutral prisms, from its solution in methylic alcohol. These crystals melt at 176° (348.8° F.), and evaporate without decomposition. Flückiger failed to obtain this body from purified resin of Charas.§

Oil of Cannabis.—This volatile, pale yellow oil, was discovered in the tops by Personne,|| who claimed it to be the active principle of the plant, and to cause, in those who inhaled its effluvium, shuddering, and desire for locomotion, followed by prostration and sometimes syncope. Bolig obtained this oil from the fresh tops of the Arabian plant, and found its effects to be similar to those claimed for it by Personne, and further stated that it contained oxygen. Personne succeeded in separating the oil into two hydrocarbons: *Cannabine*, $C_{18}H_{20}$, and *Cannabine Hydride*, $C_{18}H_{22}$, the latter being a solid composed of platy crystals.

Other unessential bodies have been determined, to none of which the activity of the drug can be assigned.

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* *Am. Jour. Phar.*, 1885, 264; from *Phar. Jour. and Trans.*, 1885, 574.

† *Phar. Jour.*, 1847, 171.

‡ *Chem. News*, 1871, 77.

§ *Pharmacographia*, 549.

|| *Jour. de Phar.*, 1857, 48; Canstatt's *Jahres.*, 1857, 28.

PHYSIOLOGICAL ACTION.—Carefully excluding, as far as possible, symptoms that may have arisen from the Indian product, the following will give some idea of the action of the herb of low altitudes, collated from the experiments of Drs. Schreter, Knorre, Wibmer, Wirk, and Lembke with the tincture, in doses of from 5 to 70 drops, and the infusion:[*] Depression and absent-mindedness; confusion, vertigo, and congestion, followed by cephalalgia; earache; toothache; dryness of the mouth, throat, and lips; loss of appetite; nausea, and vomiting after coffee; slight inflammation of the meatus urinarius, and diminished urine; sexual excitement without desire; oppression of the chest, and palpitation of the heart; weakness of the limbs; itching of the skin; and dreaminess during sleep.

DESCRIPTION OF PLATE 154.

Drawn from plants growing at Union, N. Y., July 26th, 1886.

1. A portion of male inflorescence.
2. Sterile flower.
3. A portion of female inflorescence.
4. Female flowers.
5. Male flower-bud.

6, 7, 8. Stamens.

9. Female flower.
10. Calyx of female flower.
11. Ovary.
12. Section of ovary.
13. Styles.

14, 15, 16. Fruit.

17, 18, 19. Seed.

20. Longitudinal section } of a seed.
21. Horizontal section } of a seed.
22. Embryo.

(2 and 4–22 enlarged.)

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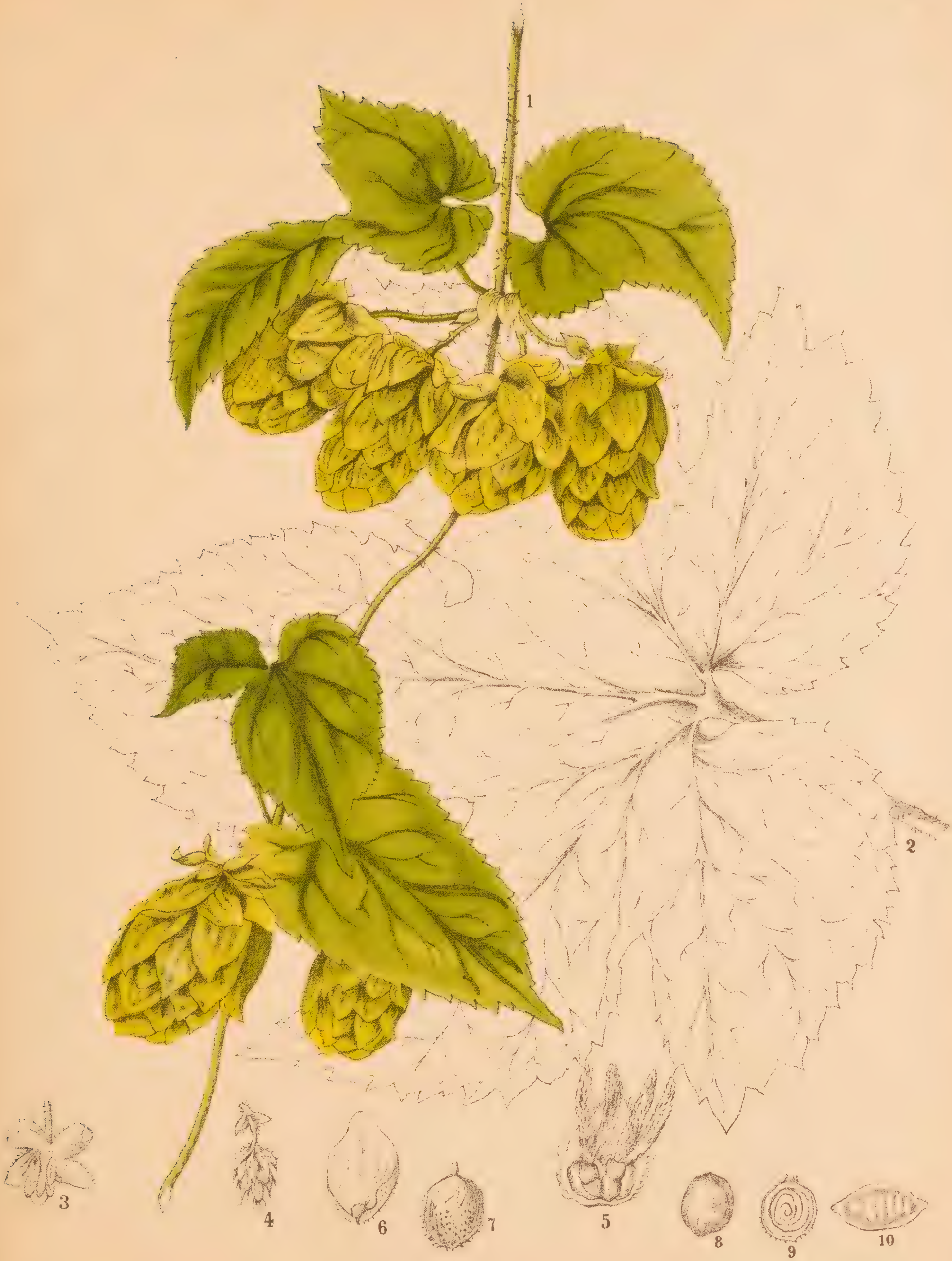
[*] Allen, *Ency.*, 2, 492, *et seq.*



C.M. ad nat del. et pinxt.

HÙMULUS LÙPULUS, Linn.

N. ORD.—URTICACEÆ.

S. ORD.—CANNABINEÆ.

GENUS.—**HUMULUS**,* LINN.

SEX. SYST.—DIŒCIA PENTANDRIA.

LUPULUS.

HOP.†

SYN.—HUMULUS LUPULUS, LINN.; H. AMERICANUS, NUTT.

COM. NAMES.—COMMON HOP, NORTHERN VINE; (FR.) HOUBLON; (GER.) HOPFEN.

A TINCTURE OF THE STROBILES OF HUMULUS LUPULUS, LINN.

Description.—This rough, twining perennial, grows to a height of 20 feet or more. *Rootstalk* large, thick, and branching; *stems* several from the same root, slender, solarly voluble, almost prickly downward. *Leaves* longer than the petioles, mostly opposite, and cordate, the upper neither lobed nor cleft, the lower palmately 3- to 5-lobed, all coarsely serrate, sharply pointed, and very rough, the roughness most resistant from the periphery inward; *stipules* at first erect, then reflexed, ovate, persistent, interpetiolar, the adjacent ones of each opposite pair confluent at their bases. *Flowers* diœcious. *Fertile flowers* in short axillary and solitary, sessile catkins; *bracts* ovate, acute, smoothish, foliaceous, and imbricated, each 2-flowered; *calyx* of a single sepal embracing the ovary; *ovary* ovoid, smooth, 1-celled; *ovules* solitary, pendulous; *styles* 2, very hairy, much longer than the ovary. *Sterile flowers* in lax, divaricate, axillary panicles; *sepals* 5, oblong, obtuse; *stamens* 5, opposite the sepals; *filaments* very short; *anthers* erect, oblong, linear, and apiculate, opening by two terminal slits. *Fruit* (!) a membranaceous, cone-like catkin or strobile, consisting of the whole female inflorescence now enlarged and scale-like; *achenium,* or true fruit, seed-like, subglobular, invested with a large scalaceous calyx (the enlarged bractlet); the true fruits and calices sprinkled with yellow, resinous, globular, and top-shaped grains (Lupulin). *Seeds* solitary, pendulous; *testa* thin; *embryo* coiled in a flat spiral.

History and Habitat.—The Hop is found wild, and is indigenous throughout Europe, except its most northern country, from whence it extends eastward through Central Asia to the Altai Mountains. In North America it is without doubt indigenous northward and westward, where it grows in alluvial soils, blossoming in July, and fruiting in September.

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* From *humus*, damp, the habitat being alluvial soils.

† Anglo-Saxon, *hoppan*, to climb.

The cultivation of Hops in Central Europe—where their economic growth undoubtedly began—dates from about the middle of the eighth century. Their culture was introduced into England from Flanders in 1524, but they were not used in brewing until 1530, during the reign of Henry VIII, though they were indigenous to the British Islands at that time. The use of Hops in brewing is to add a wholesome bitterness, as well as to preserve the resulting product; this is the principal object of its culture, although the young shoots are often cooked and eaten in lieu of asparagus, and were once an article of hucksterage for that purpose. In keeping, Hops often become brown and acquire an unpleasant odor from the formation of valerianic acid; this is removed by bleaching them with sulphuric oxide. The use of the bleached hop caused an edict to be issued by Henry VIII that in his household no hops nor brimstone must be put into the ale. Gerarde, in speaking of the hop as used "to season" the ale, says that they "rather make it a physical drinke to keepe the body in health, than an ordinary drinke for the quenching of our thirst."

The medical use of hops was at first confined to their tonic, stomachic, and sedative properties; the latter was often doubted, but proved itself in many ways. During the illness of George III, in 1787, a pillow filled with hops was used instead of opiates to promote sleep; this practice is held to the present day. The principal use now is as a fomentation in painful swellings and suppurations, though their internal use in tincture, infusion, and powder, as an alterative, tonic, stomachic, diuretic, antirheumatic, antilithic, febrifuge, and anthelmintic is quite extensive. Hops are said to be not only a nerve sedative, but also to have the same influence upon the heart's action.

The use of Lupulin—*i. e.*, the grains naturally found in the strobile—is principally due to the experiments of Dr. A. W. Ives, who first brought into notice the economy in bulk attainable by its use; and who, after naming the product as above, proved that most, if not all, the virtues of the hop lay in this product.

The strobiles are officinal in the U. S. Phar., as well as Lupulin, the first under the name *Humulus*, the second, *Lupulinum;* the preparations are: *Tinctura Humuli; Extractum Lupulini Fluidum;* and *Oleoresina Lupulini.* In the Eclectic Materia Medica the preparations are: *Extractum Lupulini; Infusum Humuli; Tinctura Lupulini;* and *Unguentum Humuli.*

PART USED AND PREPARATION.—The fresh ripe strobiles are treated like all the drugs of this order, as described under Celtis, page 152–3. The resulting tincture has a clear orange color by transmitted light; retains the odor of the strobiles to a high degree; is very bitter; and has an acid reaction.

CHEMICAL CONSTITUENTS.—*Lupulic Acid,*[*] $C_{32}H_{50}O_7$. This body was first determined by Payen,[†] and afterward more or less purified by Lermer,[‡] who called it *Bitter Acid of Hops*, and isolated it as large, odorless, brilliant, rhombic prisms, of extremely bitter taste, soluble in water; in this view he was corroborated by Etti.[*] Bungener,[†] however, disclaims the solubility and purity of the product on account of the potash used in its isolation, and describes the body as follows: *Hop Bitter Acid*, $C_{25}H_{35}O_4$. This "acid aldehyde" results in beautiful prismatic crystals, melting at 92°–93° (197.6°–199.4° F.), soluble in alcohol and chloroform, not soluble in water, and having a bitter, acid taste. On exposure to air it turns yellow and oxidizes like the oil, forming valerianic acid in part.

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[*] Lupulin, Lupulite, Humulin, Lupulina.

[†] *Ann. de Chim. et de Phys.*, 1822, 311.

[‡] $C_{32}H_{50}O_7$.

[**Lupuline.**—This body, claimed as a liquid, volatile alkaloid, having the odor of Conia, was isolated by Griessmayer;[‡] no other analyst seems to have met with the product.]

Choline, $C_5H_{15}NO_2$.—This principle, found in the bile, brain, and yolk of eggs, was discovered in the hop by Griessmayer and Harrow.[§]

Trimethylamine, C_3H_9N.—This nitrogen base of methyl was discovered in the hop by Griessmayer. It boils at + 9.3° (+ 48.5° F.), has a nauseous odor, resembling that of herring brine, in which in fact it is found, and is soluble in water and in alcohol.[||]

Humulo-Tannic Acid,[¶] $C_{25}H_{24}O_{13}$.—This body forms in a whitish amorphous mass, soluble in water and alcohol, but not possessing the power—general in tannic acids—of precipitating gelatine; however, on heating the mass at 130° (266° F.), it parts with one molecule of water, and is transposed as follows:

$$\underset{\text{Humulo-Tannic Acid.}}{(C_{25}H_{24}O_{13})_2} = \underset{\text{Water.}}{H_2O} + \underset{\text{Phlobaphine.}}{C_{50}H_{46}O_{25}}.$$

This *phlobaphine* results in a red amorphous substance which readily precipitates gelatine.[**]

Oil of Humulus, $C_{10}H_{16} + C_{10}H_{16}O$ (Wittstein).—This oil, obtained from the strobiles, results as a greenish- or reddish-brown body, according to the ripeness of the cones. It is thin, neutral, hot tasting, and slightly bitter, has a density of 0.910, distills at 125°–175° (257°–347° F.), and hydrates at 210° (410° F.). It resinifies when exposed to the air, and develops *valerianol* ($C_5H_{10}O$), which afterward passes into

Valerianic Acid, $C_5H_{10}O_2$.—This body, obtained from the roots of *Valeriana officinalis*, was determined by Méhu[††] to also exist in Lupulin in the proportion of 0.1 to 0.17 per cent., though other analysts claim that only in stale and spoiled hops, oxidized Lupulic Acid, and the resinified oil on account of an admixture of that acid, can the body be found. Valerianic Acid is a thin oily liquid, having a sour smell of rotten cheese, and boiling at 175° (347° F.).

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[*] *Am. Jour. Phar.*, 1879, 27; from *Jour. Chem. Socy.*, 1878: from *Ding. Polyt. Jour.*, 227, pp. 354–7.

[†] *Am. Jour. Phar.*, 1884, p. 427; from *Phar. Jour. and Trans.*, 1884, 1008.

[‡] *Am. Jour. Phar.*, 1874, 360.

[§] *Chem. News*, 1885, 149.

[||] Griessmayer, *ibid.*

[¶] Lupulo-Tannic Acid; but this name is not appropriate, as Dr. Bigelow appears to prove that there is no tannin in Lupulin, unless some other portion of the hop dusts into this product.

[**] Etti, 1826–8, and *Am. Jour. Phar.*, 1879, 27; before quoted.

[††] *Thesé, Montpelier*, 1867, in Flück. and Han., *Pharmacographia.*

Resins.—Etti determined two resins—α, white and crystallizable; β, brown and amorphous.

[“**Hopeine.**”—This so-called narcotic alkaloid, claimed to be extracted from hops by Williamson and Springmuehl, of London, is proven by Dujardin-Beaumetz to be a commercial fraud. The product claimed a high price, as it was said to be only obtainable at great expense from American Wild Hops, and consisted of morphine and some aromatic oil.]

PHYSIOLOGICAL ACTION.—Hops are truly sedative in many nervous troubles, and to the heart's action, though probably not at all narcotic. In large doses they cause colic and constipation. The following symptoms, compiled from various doses of the drug, show it to be an irritant to the vaso-motor system and the inhibitory nerves. The symptoms were: Vertigo and confusion of the head; cerebral and arterial congestion; dilation of the pupils; thirst, nausea, loss of appetite and vomiting; diarrhœic stools with great urging; burning pain along the urethra with increased urine; respirations deep, almost stertorous, and rapid; decrease of the pulses; with high temperature and profuse perspiration.*

Description of Plate 155.

1. End of a fruiting branch, Binghamton, N. Y., Aug. 27th, 1885.†
2. A medium-sized leaf.
3. Male flower.
4. Female catkin.
5. A female bract.
6. Enlarged fruiting bract.
7. Achenium enveloped in its persistent calyx.
8. Achenium, with calyx removed.
9. Vertical } section of the seed.
10. Horizontal } section of the seed.

(3–10 enlarged.)

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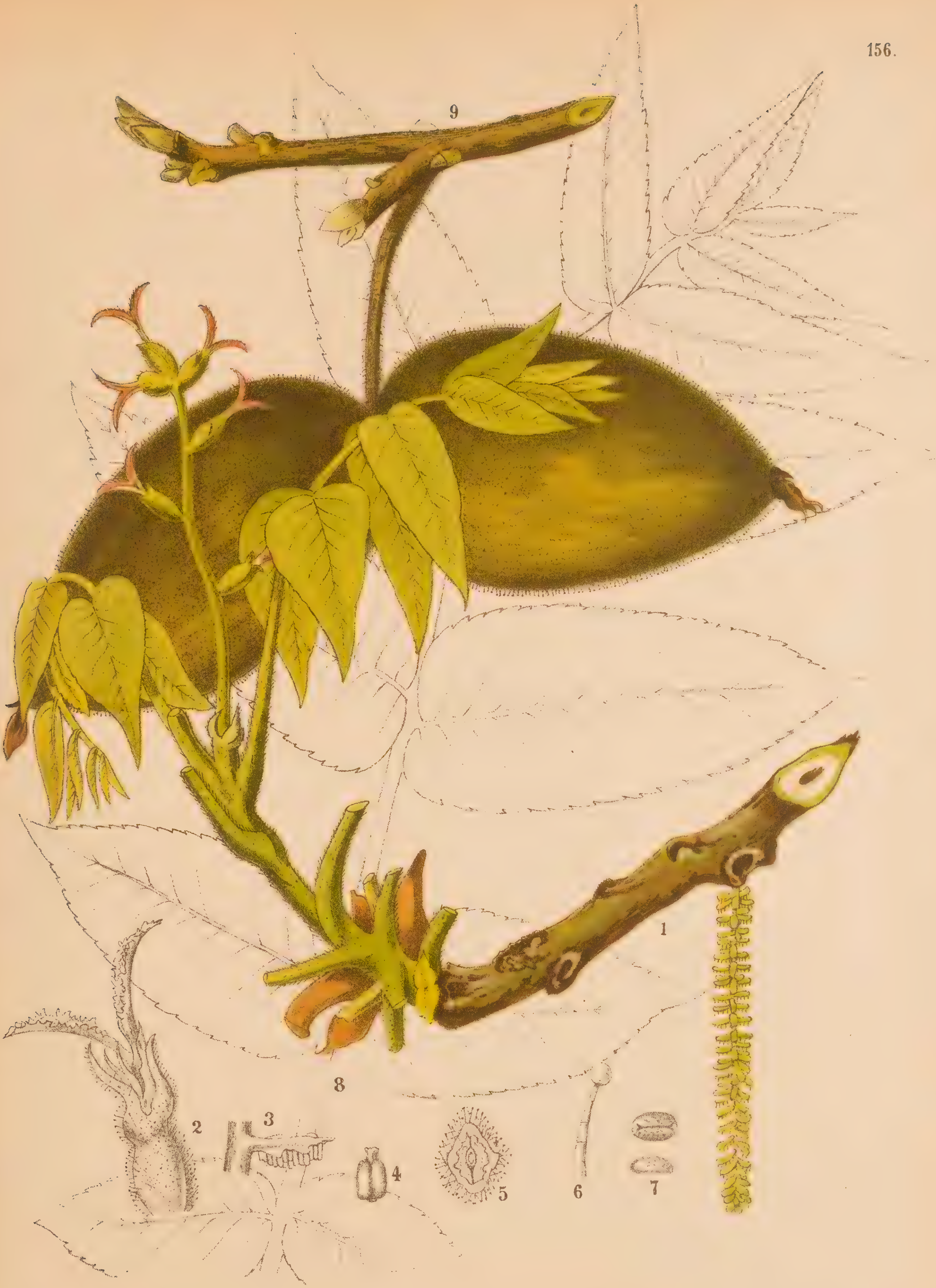
* Allen, *Ency. Mat. Med.*, v, 625.

† By an error, the prickly points on the stem were omitted below the fruits in the drawing.



𝔉𝔪.ad nat.del.et pinxt.

JÙGLANS CINÈREA, Linn.

GENUS.—**JUGLANS,**[*] LINN.

SEX. SYST.—MONŒCIA POLYANDRIA.

JUGLANS CINEREA.

BUTTERNUT.

SYN.—JUGLANS CINEREA, LINN.; JUGLANS CATHARTICA, MICHX.; JUGLANS OBLONGA, MILL.

COM. NAMES.—BUTTERNUT, OIL-NUT, WHITE WALNUT; (FR.) NOYER GRIS; (GER.) WALLNUSS.

A TINCTURE OF THE FRESH YOUNG INNER BARK OF JUGLANS CINEREA, LINN.

Description.—This oblate tree usually attains a height and breadth of from 25 to 40 feet. *Stem* early branching, deliquescent; *bark* strongly aromatic and resinous, smoothish when young, and of a grayish color; *wood* brown, somewhat lighter in color and texture than that of the black walnut, its specific gravity varies from .376 to .487, and its weight from 22 to 30 lbs. per cubic foot. *Leaves* alternate, compound, odd-pinnate, about one foot long when mature; *petioles* long, densely clammy-pubescent; *leaflets* opposite, or nearly so, in from 7 to 10 pairs, and the terminal one, each oblong-lanceolate, sharply serrate, rounded at the base, pointed, and downy beneath. *Inflorescence* terminal on the branches; *flowers* monœcious, the *fertile* ones in a cluster of from 3 to 5, amid the new leaves of the season; the *sterile* many, hanging in catkins (*aments*) from the leaf scars of the previous year. *Fertile flowers: calyx* regular, 4-toothed, clammy-pubescent; *corolla* consisting of 4 minute *petals* in the sinuses of the calyx. *Style* very short and comparatively thick; *stigmas* 2, long, and densely fringed with blunt papillæ upon their inner surfaces. *Sterile flowers: stamens* projecting from the rachis of the ament in sufficient numbers to cover it throughout its entire length; *calyx* an irregular, horizontal, flat, bracted scale, furnished with a terminal and from 3 to 5 lateral teeth; *stamens* 8 to 14 or more, irregularly suspended from the under surface of the bract; *filaments* very short and thick; *anthers* ovate-oblong, 2-celled, furnished with a short abrupt point. *Fruit* oblong, pointed, 2 to 3 inches long and 1 to 1½ inches in diameter when green; *epicarp* fleshy, fibrous, and densely covered with a sticky pubescence; when dry, coriaceous, indehiscent; *endocarp* thick, bony, sculptured with deep rough-edged sinuses; *nut* 1-celled above, 2-celled below.

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[*] The classical name of the walnut, *Juglans regia;* a contraction from *Jovis glans*, Jupiter's nut.

JUGLANDACEÆ.—A small family of very useful trees. *Wood* hard and dense. *Leaves* alternate, pinnate, astipulate. *Flowers* monœcious, the fertile ones single or in a small cluster or spike; *calyx* adherent to the ovary, regular, 3 to 5 lobed; *petals* sometimes present; the sterile flowers in long catkins; *calyx* bracted and irregular, overlapping the stamens like a hood. *Ovary* somewhat more than 1-celled, containing a single orthotropous ovule, the walls become thick and fleshy, affording thus a covering (*epicarp*) for the nut. *Fruit* a dry drupe, furnished with a bony endocarp, splitting into 2 valves in germination, and enclosing a large 4-lobed seed; *albumen* none; *embryo* 2 large, lobed, corrugated, sarcous, oily cotyledons.

The following fruits or nuts of this family are greatly esteemed on account of their rich oily "meats": The black walnut (*Juglans nigra, Linn.*), the butternut (*Juglans cinerea, Linn.*), the Maderia nut or English walnut (*Juglans regia, Linn.*), a native of Persia and the Himalaya, and cultivated in England and along the Mediterranean, the hickory or mocker-nut (*Carya tomentosa, Nutt.*, and *var. maxima, Nutt.*), the shell-bark or shag-bark hickory (*Carya alba, Nutt.*), the western shag-bark hickory (*Carya sulcata, Nutt.*), and the pecan-nut (*Carya olivæformis, Nutt.*).

History and Habitat.—The butternut is a common tree throughout the Eastern, Middle, and Western States, and from the Canadas southward along the mountains, growing in rich woods along river banks, flowering from April to May, and ripening its fruit in September. The wood, as before mentioned, is valuable on account of its lightness, durability, and freedom from worm infestations; the fruit, when half formed, makes a fine pickle, and when ripe an article of hucksterage; the sap, gathered in its season, forms on boiling a fine sugar equal if not superior to that of the maple; the leaves, bark, and unripe fruit afford a dye of a chocolate-brown color for woollen goods, which, with that of the black walnut, was used in the South to great extent during the rebellion as a dye for the uniforms of the soldiers. The use of a decoction of the inner bark in medicine has been of some importance, especially as a mild cathartic; it acts thus without colic, and is said to leave none of the constipating effects so frequently following general cathartics; in diarrhœa and even dysentery it receives many encomiums from botanic physicians. The powdered leaves act as a rubefacient and vesicant, and have been used as a substitute for cantharides.

The inner bark of the root is officinal in the U. S. Ph. as *Extractum Juglandis;* in the Eclectic Materia Medica the same preparation is recommended.

PART USED AND PREPARATION.—The inner bark of young stems and roots, collected in May or June, is chopped and pounded to a pulp and weighed. Then two parts by weight of alcohol is taken, the pulp thoroughly mixed with one-sixth part of it, and the rest of the alcohol added. After having stirred the whole well, it is poured into a well-stoppered bottle and allowed to stand eight days in a dark, cool place.

The tincture, procured by straining and filtering, should be opaque in layers of any quantity; in thin layers it should have a deep, rich, reddish-brown color by transmitted light. It has an astringent, bitter taste, and an exceedingly acid reaction.

CHEMICAL CONSTITUENTS.—*Juglandin.* This body, extracted by Merrell, is spoken of as an impure resin; it probably contains the following principle, to which its action is doubtless due.

Nucin:[*] this acid, acrid body, was first discovered in the green epicarps of Juglans regia. Wittstein represents it as forming reddish-yellow, glossy, brittle needles, dissolving copiously in alkalies and ether, less soluble in alcohol, and but slightly in water. Nucin gives a beautiful purple color with the borates and phosphates of alkalies, and with subacetate of lead. Tannin,[†][§] resin,[‡][§] volatile oil,[†][§] fixed oil,[‡] glucose,[‡] and a volatile acid,[§] have also been determined.

PHYSIOLOGICAL ACTION.—Juglandin, the extract of butternut, acts, according to Paine, as a drastic purge, producing irritation and inflammation of the mucous lining of the intestines, and if continued, its exhibition is followed by an exanthematous eruption much resembling the flush of scarlatina. It causes also a congestion of the portal circulation, and subsequent watery evacuations of the bowels.

DESCRIPTION OF PLATE 156.

1. End of flowering branch, with larger leaves removed; Binghamton, N. Y., June 2d, 1884.
2. Female flower (enlarged).
3. Male flower (enlarged).
4. Stamen (enlarged).
5. Section of ovary (enlarged).
6. Hair of pubescence (x 50).
7. Pollen (x 200).
8. Half-grown leaf.
9. Fruit.

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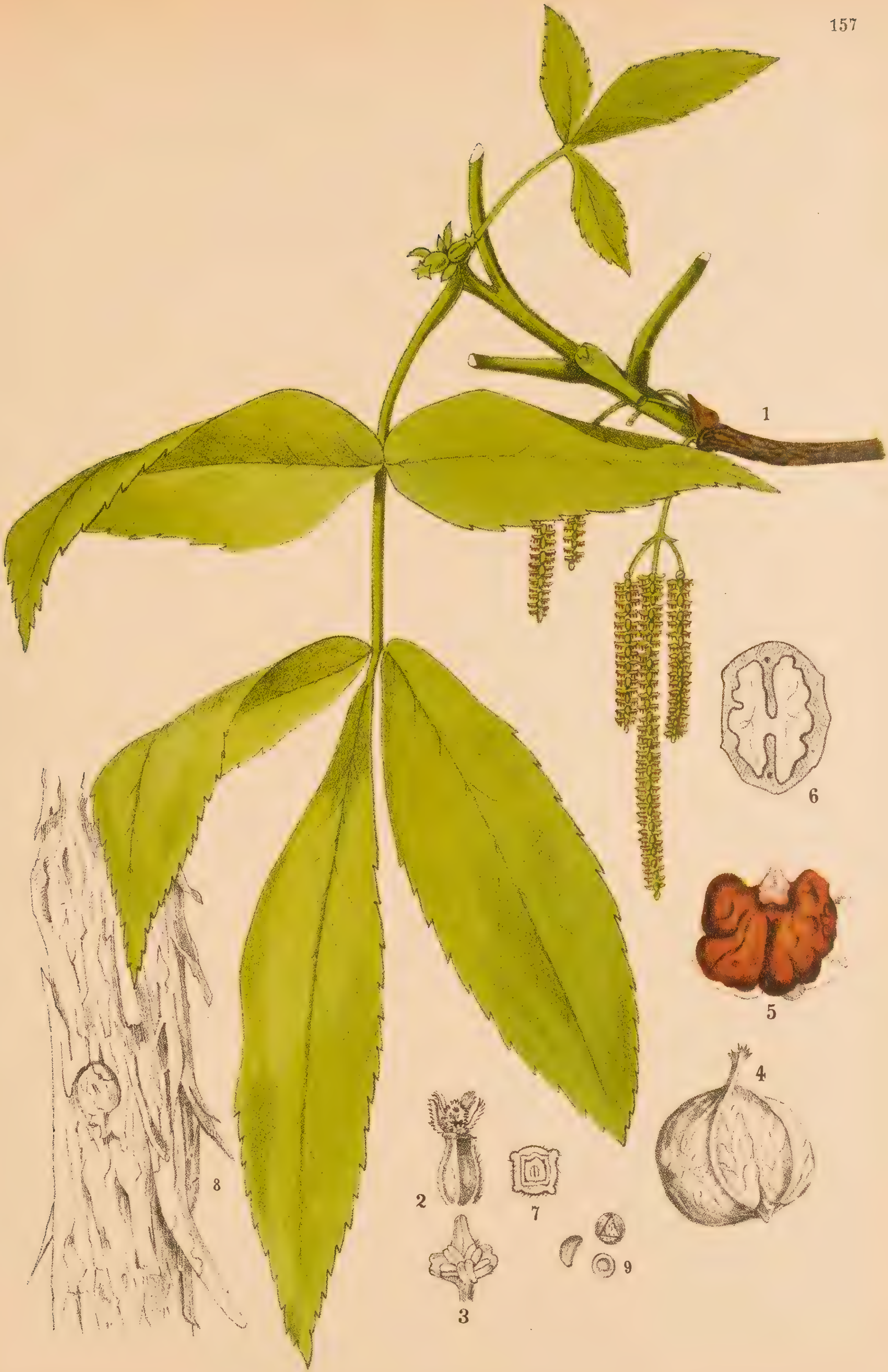
[*] *Juglandic acid* (Thiebaud).

[†] Thiebaud.

[‡] S. Witherill.

[§] E. S. Dawson.



C.M. ad nat del. et pinxt.

CÁRYA ÁLBA, Nutt.

GENUS.—CARYA,* NUTT.

SEX. SYST.—MONŒCIA POLYANDRIA.

CARYA ALBA.

HICKORY.

SYN.—CARYA ALBA, NUTT.; CARYA SQUAMOSA, BART.; JUGLANS SQUAMOSA, MICHX.; JUGLANS ALBA, LINN.; JUGLANS COMPRESSA, WILLD.

COM. NAMES.—SHAG-BARK OR SHELL-BARK HICKORY, WHITE HICKORY, KISKYTOM.

A TINCTURE OF THE RIPE "MEATS" OF THE NUTS, CARYA ALBA, NUTT.

Description.—This valuable, rapid-growing tree, furnishing the best hickory nuts of the markets, attains a height of from 30 to 80 feet, and a breadth of from 20 to 50 feet. *Stem* erect, deliquescent, from 9 to 20 inches in diameter; *bark* smooth when young, but after the twelfth to fifteenth year it exfoliates in strips or wide laminæ from 1 to 4 feet long, and one-eighth to a quarter inch thick; this without injury to the life of the tree. The *bark* is brownish-gray externally, cinnamon color internally, very oily and inflammable, producing on combustion a great heat. *Wood* white internally, yellow near the bark, very valuable in the arts, and as firewood; it is dense, tough, and elastic, its specific gravity .760, and weight 47½ lbs. per cubic foot. Notwithstanding its hardness it rots easily when subjected to moisture. *Leaves* 3 or 4 compound, odd-pinnate, appearing with the flowers; *leaflets* 5, taper-pointed, sessile, or nearly so, finely serrate, the three terminal obovate or obovate-lanceolate, the two nearest the short petiole much smaller, oblong-lanceolate. *Sterile flowers* in pendent catkins, branched to the form of a trident, situate on a common peduncle arising from the base of the shoot of the season, in the axis of the large, conspicuous, tardily deciduous, scaly, leaf buds; *calyx* naked, clinging to its bract, irregularly 2 to 3 parted. *Stamens* 3 to 8 or more, suspended from the bract-like calyx; *filaments* short and inconspicuous or wanting; *anthers* 4, downy pubescent. *Fertile flowers* 2 to 3 or more in a pedunculated cluster or spike amid the young leaves, and terminal on the growth of the season; *calyx* with a 4-toothed limb; *petals* wanting; *stigmas* 2 to 4, large, sessile, papillose, and persistent. *Fruit* a globular or depressed-globose, somewhat four-sided nut; *epicarp* thick, fleshy, and fibrous, splitting into 4 equal valves when dry; *endocarp* bony, smooth between the rounded ridges, and tipped with a sharp point, somewhat 2-celled above and 4-celled below; *cotyledons* corrugated, rich, and sweet. Read description of Natural Order under Juglans cinerea, 156.

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* An ancient name of the walnut, *καρύα*, *karya*.

History and Habitat.—The shag-bark hickory is indigenous to the Atlantic States of North America from Maine to the Carolinas, growing in rich woods and along streams. It blossoms in May and ripens its fruit in October.

The bark of the hickory affords with copperas an olive, and with alum a green, dye for woolens; the ash yields a very fine lye, and the "meats" an excellent oil for burning. The wood is valuable for the handles of most light and heavy implements, for barrel-hoops, sail-rings, hand-spikes, and pins, but is useless for any purpose in which it would be subjected to alternate wettings and dryings. In medicine I can find no account of its use prior to the provings, which so far are slight. Carya is not mentioned in the U. S. Ph. nor the Eclectic Materia Medica.

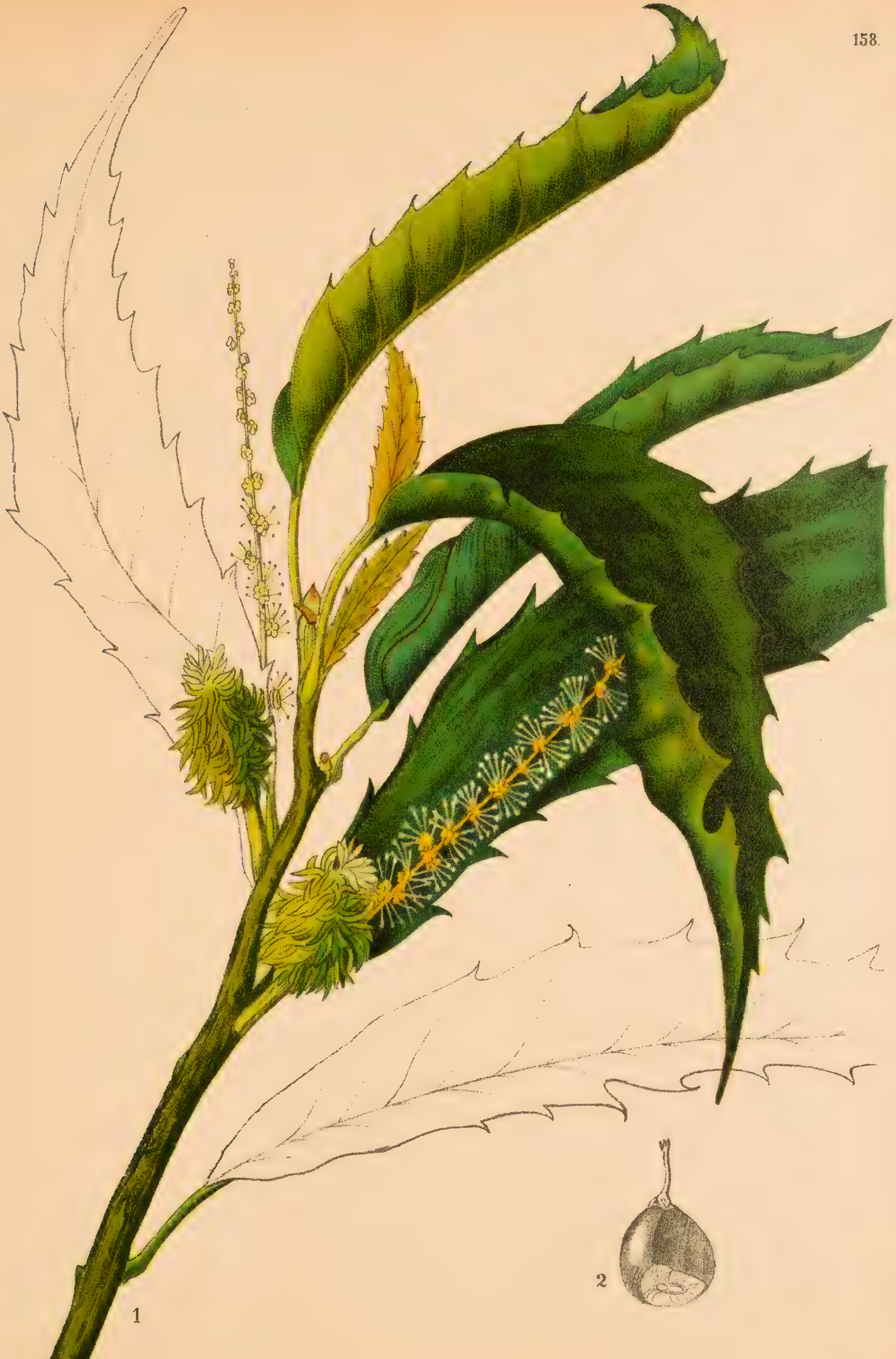
PART USED AND PREPARATION.—The ripe cotyledons are finely powdered, covered with five parts by weight of alcohol, and kept for eight days in a tightly-stoppered bottle, in a dark, cool place.

The tincture obtained by decanting and filtering, has a light-canary color by transmitted light, an odor and taste of the nut, and a neutral reaction.

CHEMICAL CONSTITUENTS.—I am unable to find record of any analysis of this plant or its seed. On evaporating the tincture under the addition of water until the alcohol entirely passed off, a light and a heavy oil separated, both liquid at ordinary temperatures. The heavy oil separated in greater quantity, and solidified at 7° (44.6° F.); both retained the peculiar odor and taste of the nut. No specific principle was yielded by farther analysis.

DESCRIPTION OF PLATE 157.

1. End of flowering branch; Binghamton, N. Y., June 3d, 1884.
2. Female flower (enlarged).
3. Male flower (enlarged).
4. Nut.
5. Longitudinal section of the nut.
6. Horizontal section of the nut.
7. Section of the ovary (enlarged).
8. Trunk of tree (diminished).
9. Pollen (3 views x 200).



F.M. ad nat del. et pinxt.

CASTÀNEA VÉSCA, Linn.

Tribe.—QUERCINEÆ.

GENUS.—**CASTANEA**,* TOURN.

SEX. SYST.—MONŒCIA POLYANDRIA.

CASTANEA VESCA.

CHESTNUT.

SYN.—CASTANEA VESCA, LINN.; CASTANEA VESCA, VAR. AMERICANA, MICHX.; CASTANEA EDULIS, GAERTN.

COM. NAMES.—CHESTNUT; (FR.) CHATAIGNIER; (GER.) KASTANIE.

A TINCTURE OF THE FRESH LEAVES OF CASTANEA VESCA, VAR. AMERICANA, MICHX.

Description.—This forest tree, highly esteemed for its timber and edible nuts, attains a growth of from 40 to 80 feet in height. The *stem* is deliquescent, from 2 to 4 feet in diameter, and covered with a thick, corrugated bark, smoothish upon the corrugations; *branches* thick, very irregular, and contorted. The wood commercially, is light and porous, having a sp. gr. of 404, and weighing but 25 lbs. 4 oz. per cubic foot; on account of its durability it is valued principally for fencing. The *leaves* are petiolate, oblong-lanceolate, coarsely serrate, pointed at the tip and acute at the base, from 4 to 9 inches long, and from 2 to 4 inches wide; they are particularly noticeable on account of their straight pinnate veins. *Inflorescence* cream-colored, monœcious, axillary upon the ends of the branches, and appearing after the leaves. *Sterile flowers* in irregularly placed clusters upon naked, subcylindrical aments, that vary from 3 to 6 inches in length. *Calyx* generally 6-parted. *Stamens* 8 to 20; *filaments* slender; *anthers* 2-celled. *Fertile flowers* few, usually from 2 to 3 closely crowded in an involucre. *Involucres* in a cluster at the base of the aments, ovoid, thickly covered with spines. *Calyx* tubular with a bell-shaped 6-lobed border, encircling the ovary in the form of a crown. *Ovary* 3 to 6-celled; *ovules* 6 to 14; *stigmas* awned, equal in number to the cells of the ovary. *Stamens* 5 or more, rudimentary, rarely perfect, longer than the calyx. *Fruit*, a large, hard, thick, echinate, 4-valved bur, enclosing from 1 to 3 or more nuts, laterally flattened by compression, in shapes depending upon the number in the bur.

Cupuliferæ.—Trees or shrubs with white, and generally firm, hard wood. *Stipules* caducous; *leaves* alternate, pinnately veined. *Inflorescence* upon the ends of the branches; *flowers* monœcious; *sterile flowers* in catkins (except Fagus); *fertile flowers* solitary, grouped or spiked, furnished with a scaly or echinate cup or bur forming a receptacle for the nuts; *calyx* adherent to the ovary, the border forming a ring or crown about its summit. *Stamens* of sterile flowers either equal in number to the calyx lobes or two or three times as many, usually exserted; rudimentary stamens often present in the fertile flowers. *Ovary* generally more or less 2- to 7-celled; *ovules* anatropous, one or more in each cell; all of the ovules and cells except one aborting, to form a 1-seeded nut. *Seeds* mostly edible, forming among others the following nuts: Sweet-acorn (*Quercus alba*), Chestnut (*Castanea vesca* and *var. Americana*), Chinquapin (*Castanea pumila*), Beech-nut (*Fagus ferruginea*), Hazel-nut (*Corylus Americana, C. rostrata*), and Filbert (*Corylus avellana*). *Albumen* none; *embryo* formed of two thick, sarcous cotyledons and a short or retracted radicle, filling the whole nut.

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* Κάστανα or Κασϑαναια, a city of Pontus, noted for its chestnut trees.

History and Habitat.—This variety is indigenous to the United States from southern and middle parts of Maine to Michigan and southwards, especially along the hills and mountains; flowering in June and July, fruiting in October. The chestnut tree is remarkable both for its size and longevity; there is a specimen on the Neversink Highlands, New York Harbor, called the "elephant," which is said to be fully five hundred years old; Case's *Bot. Index*, April, 1880, mentions an individual near Seymour, Ind., measuring 22 feet in diameter two feet from its base, and 70 feet to the first branch. The nuts when dry are sweet and wholesome, forming an article of merchandise. The best chestnuts of France, the *marrons*, a large variety of *C. vesca*, are much esteemed when boiled, and form almost as prominent an article of hucksterage as the common roasted peanut does here. In the south of France and North of Italy the harvest is very large; here the nuts are largely used as a substitute for wheat flour and potatoes. The leaves are officinal in the U. S. Ph. as *Extractum Castaneæ Fluidum*.

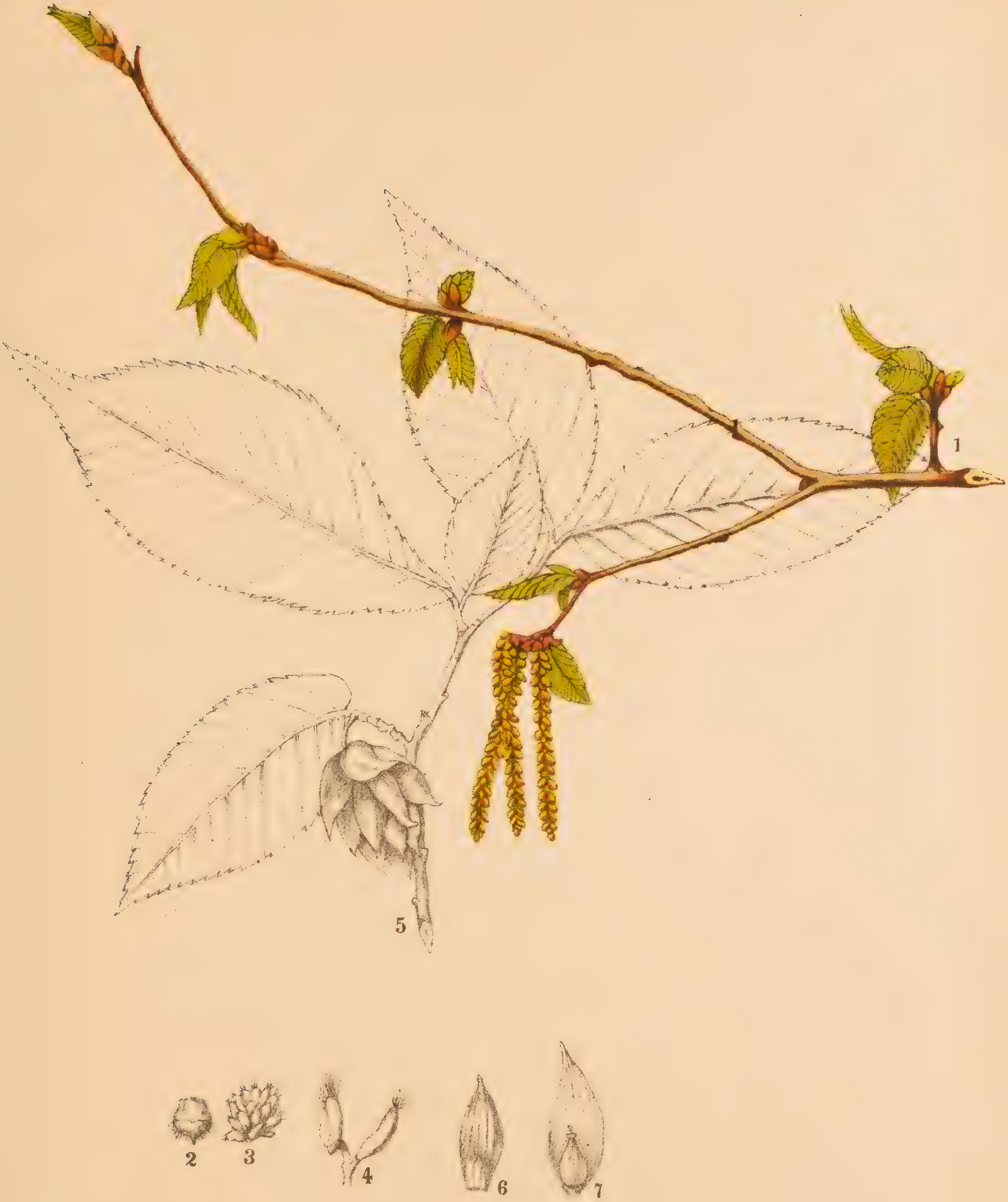
PART USED AND PREPARATION.—The fresh leaves, gathered in September while still green, are chopped and pounded to a pulp and weighed. Then two parts by weight of alcohol are taken, the pulp mixed with one-sixth part of it and the rest of the alcohol added. After stirring the whole well and pouring it into a well-stoppered bottle, it is allowed to stand eight days in a dark, cool place. The tincture is then separated by decanting, straining and filtering. Thus prepared, it has a deep-brown color by transmitted light, an odor like that of the leaves, an astringent taste, and highly acid reaction.

CHEMICAL CONSTITUENTS.—The only analysis of this plant is one of the leaves, conducted by L. J. Steltzer (Am. Jour. Phar., 1880, p. 292). He determines the constituents to be: tannin 9 per cent., gum, albumen, a soft yellowish resin, fat and extractive; together with salts of K, Ca, Mg, and Iron. When assaying for an alkaloid, he obtained negative results.

PHYSIOLOGICAL ACTION.—I am unable to find any data upon this. The leaves in decoction have been used for whooping-cough. The provings by Dr. Houghton show no particular action upon the air-passages. Castanea is claimed to have a sedative action upon the nerves of respiration.

DESCRIPTION OF PLATE 158.

1. End of branch in flower, Binghamton, N. Y., July 26th, 1882.
2. A nut, representing the form when two are enclosed in the bur.



C.F.M. ad nat del. et pinxt.

ÓSTRYA VIRGÍNICA, Willd.

Tribe.—CARPINEÆ.
GENUS.—**OSTRYA**,[*] MICHELI.
SEX. SYST.—MONŒCIA POLYANDRIA.

OSTRYA.

HOP-HORNBEAM.

SYN.—OSTRYA VIRGINICA, WILLD.; CARPINUS OSTRYA-AMERICANA; MICHX.; C. OSTRYA, MICHX. f.
COM. NAMES.—AMERICAN HOP-HORNBEAM, IRON-WOOD,[†] LEVER-WOOD; (GER.) HOPFENHAINBUSCHE.

A TINCTURE OF THE HEART-WOOD OF OSTRYA VIRGINICA, WILLD.

Description.—This small forest-tree seldom attains a growth of over 30 feet in height and a diameter of 8 inches. *Bark* of the younger trees birch-like, of the older ones, much resembling that of the white oak, although its furrows are narrower. *Buds* acute, their leaves plaited upon the veins. *Leaves* ovate-oblong, taper-pointed, pinnately-veined, smooth above, and downy beneath especially upon the veins; *margin* sharply, doubly or irregularly serrate. *Inflorescence* diœcious, the flowers appearing with the leaves; *sterile flowers* in drooping, cylindrical aments, consisting of several stamens in the axil of each bract, and terminating the branches of the previous year's growth; *fertile flowers* in short catkins, a pair under each deciduous bract, and terminating the short shoot of the season; *involucral sacs* bristly hairy at the base. *Calyx* of the fertile flowers adherent to the ovary; *limb* bearded. *Stamens* 8 to 10 or more; *filaments* short, once irregularly forked; *anthers* 1-celled, one on each branch of the fork (a single, divided, 2-celled anther?), hairy at the apex. *Ovary* incompletely 2-celled and 2-ovuled, enclosed in a tubular bractlet; *style* short; *stigmas* 2, long and linear. *Fruit* an oblong-ovoid, pendulous, strobile-like cluster of several membraneous involucral sacs, each enclosing a smooth, achenious nutlet. Read the description of the natural order, page 158.

History and Habitat.—The Hop-Hornbeam is indigenous to Eastern North America from Florida northward. It is commonly found in rich woods anywhere within its limit, and flowers in April, its peculiar fruit being fully ripe in August. The other American Iron-wood, *Carpinus Americana*, need never be confounded with this species, as it is much more like a beech.

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[*] The classical name, from οστρεον, *ostreon*, a scale, alluding to the peculiar fruit.

[†] Also applied to the hornbeam, *Carpinus Americana*, Michx.

A decoction of the heart-wood of this tree has long been used by the laity as an antiperiodic in intermittent fever, and as a tonic and alterative in scrofulous dyscrasias and dyspepsia.

The wood is very hard, dense and tough, weighing 48 lbs. 11 oz. per cubic foot, and of .779 sp. gr. It is very valuable to the farmer as a "binder" for heavy loads, and for use as levers. In the manufactories it has often furnished fine cog-wheels and excellent handles for tools.

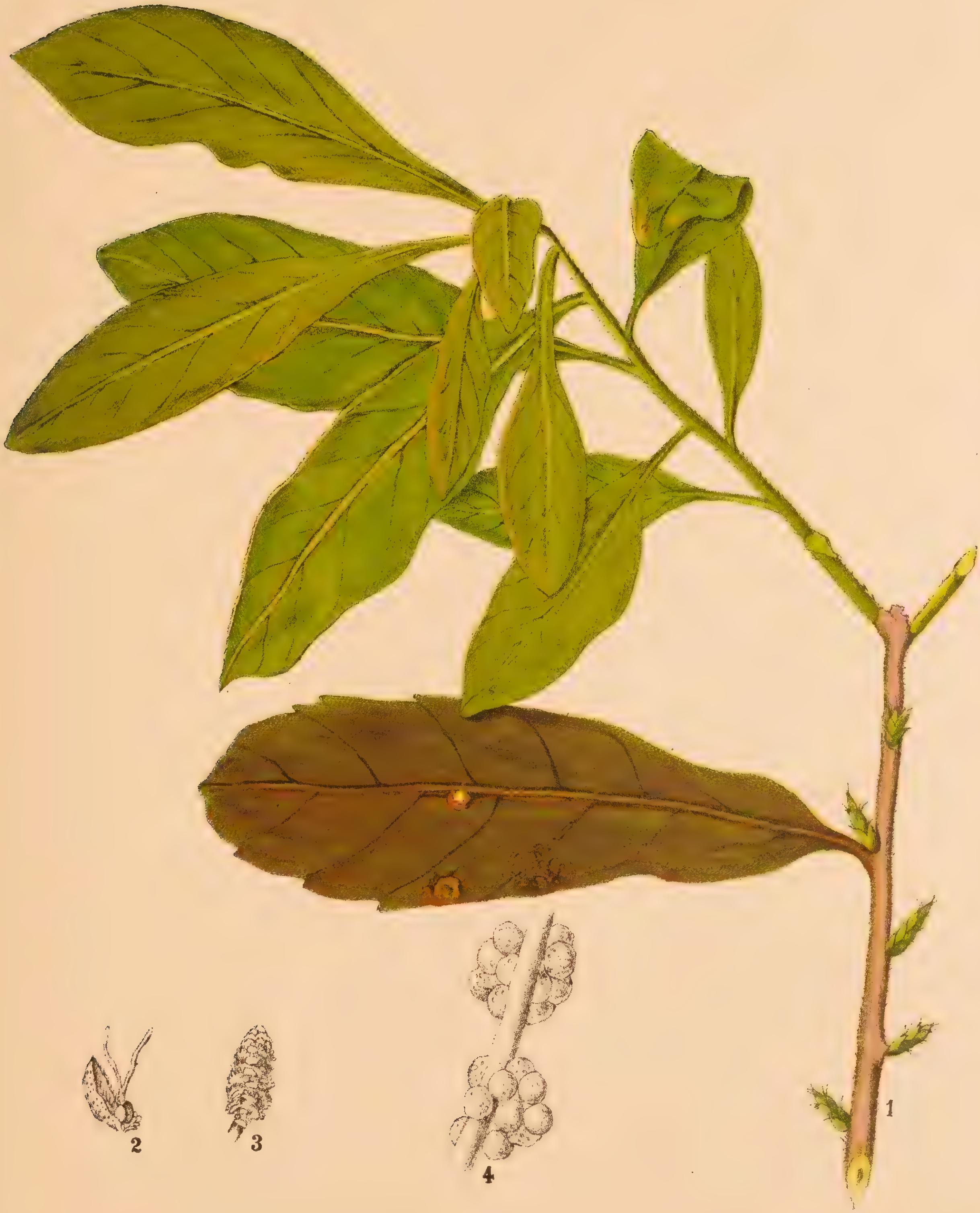
PART USED AND PREPARATION.—The fresh heart-wood, in coarse powder, is covered with five parts by weight of alcohol, and allowed to remain eight days in a well-stoppered bottle in a dark, cool place. The tincture then separated by filtration should have a clear, brilliant orange-red color by transmitted light, a slightly aromatic odor, a peculiar astringent and bitterish taste, and an acid reaction.

PHYSIOLOGICAL ACTION.—The heart-wood in powder or decoction causes headache, loss of appetite, nausea, flatulent colic, bilious defecation with great tenesmus, aching extremities, general debilitated condition, and diaphoresis.

Description of Plate 159.

1. End of sterile flowering branch, Binghamton, N. Y., May 16th, 1885.
2. Superior view of staminate bract.
3. Under view of same.
4. Stamen.
5. End of fruiting branch.
6. An involucrate scale of fruit.
7. Under view of same.

(2–4 and 6–7 enlarged.)



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MYRÌCA CERÍFERA, Linn.

N. ORD.—MYRICACEÆ. 160

GENUS.—**MYRICA**,[*] LINN.

SEX. SYST.—DIŒCIA TETRANDRIA.

MYRICA.

BAYBERRY.

SYN.—MYRICA CERIFERA, LINN.

COM. NAMES.—BAYBERRY, WAX MYRTLE, CANDLE-BERRY, TALLOW SHRUB; (FR.) ARBRE À SUIF; (GER.) WACHSBUSCH, WACHSGAGLE.

A TINCTURE OF THE FRESH ROOT BARK OF MYRICA CERIFERA, LINN.

Description.—This somewhat fragrant shrub attains a growth of from 3 to 8 feet. *Branches* numerous, especially at the summit of the plant; *branchlets* pubescent. *Leaves* somewhat preceding the flowers; they are oblong- or cuneate-lanceolate, narrowing at the base, shining or resinous dotted on both sides and pubescent underneath; *apex* obtuse; *margin* entire, or with a few wavy or short, sharp serratures near the apex. *Inflorescence* diœcious, amentaceous, solitary, from under the axillary scale-buds of the previous years' leaves; *flowers* destitute of calyx or corolla, and furnished with a pair of wedge-shaped naked bractlets. *Sterile catkins* oblong or cylindrical; *bracts* rhombic; stamens 2 to 8, usually 4, longer than the bracts; *filaments* somewhat united below; *anthers* large, 2-celled. *Fertile catkins* ovoid, smaller than the sterile; *ovary* furnished with 2 to 4, usually 3, ciliate, rounded, obscurely 3-lobed scales at its base; *stigmas* 2, thread-like. *Fruit* scattered groups of small, globular, bony, and naked nutlets, having numerous minute black grains upon its surface that are incrusted with wax.

Myricaceæ.—A small family of monœcious or diœcious shrubs or small trees, found in both Americas, India, Cape of Good Hope, and one species in Europe. *Leaves* alternate, simple, resinous dotted, and often fragrant; *stipules* present or absent. *Inflorescence*, both kinds in short scaly aments; *involucre* none. *Flowers* destitute of both calyx and corolla; *fertile catkins* in an ovoid or cylindrical head; *ovary* 1-celled, situated in the axil of a bract, and surrounded at the base by several hypogynous scales; *ovule* single, erect, orthotropous; *styles* 2, filiform, subulate, or dilated and petaloid. *Sterile catkins* with 2 to 10 stamens in the axil of a squamous bract; *filaments* free or partly united; *anthers* 2- to 4-celled; *dehiscence* longitudinal. *Fruit* a dry, drupaceous, indehiscent nut; *albumen* none; *cotyledons* sarcous; *radicle* short, superior.

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[*] Μυρω, *myro*, to flow, as the plant grows near water. The ancient name of the Tamarisk, μυρικη, *myrike*, from μυριζω, *myrizo*, to perfume, does not apply.

The plant under consideration is the only one of the family represented in our Materia Medica; several other species, however, are sometimes used as remedies, especially in domestic practice, viz.: The American and European Sweet Gale (*Myrica Gale*, Linn.), whose berries in infusion are said to be an efficient remedy for itch, and a vermifuge; the leaves are said to be substituted for hops in Sweden, in the manufacture of beer. The other six American species of the genus *Myrica* are often substituted for the species *cerifera* in domestic practice. The fruit of the Nepaul *M. sapida* is said to be pleasantly acid and edible; while the Cape of Good Hope *M. cordifolia* yields a wax, said by Thunberg to be eaten by the natives. The American Sweet Fern (*Comptonia asplenifolia*, Ait.) is in constant domestic use in some localities for checking diarrhœa, and as a fomentation in rheumatism and bruises.

History and Habitat.—The Wax Myrtle grows in thickets near swamps and marshes in the sand-belt along the Atlantic coast from Florida northward, also on the shores of Lake Erie; it is, however, rare in the interior. It flowers from April to May, according to locality. In the South it is a small evergreen tree; in Delaware and Southern New Jersey, a tall, semideciduous shrub; and in the North, dwarfed and deciduous.

Both the wax and root-bark have been used in medicine, the action of each being quite different, though both are astringent and stimulant to weakened mucous membranes.

The Bark.—Dr. Charles A. Lee* sums up the uses of the bark of the root: "Bayberry bark possesses tonico-astringent properties which entitle it to a very respectable rank among our indigenous astringents. Reduced to a powder, it is acrid and styptic to the taste, and in doses of one drachm causes a sensation of heat in the stomach, followed by vomiting and purging, and sometimes by diuresis. A decoction has been long used in diarrhœa, dysentery, uterine hemorrhage, dropsies succeeding fevers, and as a gargle in affections of the throat and fauces." When chewed it acts as a sialagogue, useful in toothache and to stimulate tender, spongy, or bleeding gums. In the Eclectic practice bayberry bark is a noted remedy in scrofulous sores and ulcers, used as a poultice; and for jaundice, especially the form termed black jaundice. In the Botanic practice bayberry bark and lobelia constituted almost a complete materia medica.

Myrica Wax.—The use of this substance in medicine was first published by Alexandre (1722), who mentions a wax which he describes and says is used in Louisiana by the colonists in the manufacture of candles; and farther adds that the water in which the wax has been "tried," when boiled to an extract, is a certain cure for the most violent cases of dysentery. Dr. Wm. Fahnestock considered the wax to be, in direct proportion to its viridity, astringent and plainly narcotic, and claims to have been eminently successful in treating with this substance many severe cases of typhoid dysentery. In Eclectic practice this wax ("Myricin") is held to be serviceable in aphthous affections of the mucous surfaces, such as stomatitis, nursing sore mouth, ulcerated fauces, bowels and stomach; also in leucorrhœa, etc., etc.

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* *Jour. Mat. Med.*, N. S., vol. i, 257.

Production and Chemistry.—Vegetable wax is a compound substance furnished by many plants either naturally or from their juices through the agency of insects. The following table, including all those that are produced in a sufficient quantity to be available, will be of interest:

NAME.	SOURCE.	MELTING POINT.	
		Cent.	Fahr.
Cacao, Chocolate Butter,	*Theobroma cacao*, L.,	30°–33°	86–91.4°
Koya Wax,	*Cinnamomum pedunculatum*, N. ab E.,	38°–40°	100.4°–104.0°
Chinese Vegetable Tallow,	*Stillingia sebifera*, Mart.,	37°–45°	98.6°–113.0°
Myrica Wax,	*Myrica cerifera*, L.,	47°–49°	116.6°–120.2°
Japan Wax,	*Rhus succedeanea*, L.,	52°–53°	125.6°–127.4°
Cow Tree Wax,	*Galactodendron utile*, Humb.,	58°	136.4°
Bees' Wax	*Apis mellifica*, etc.,	62°–63°	143.6°–145.4°
Chinese Wax,	*Coccus ceriferus*,	79°	174.2°
Ibota Wax,	*Lingustrum Ibota*, Sieb.,	80°–82°	176°–179.6°
Sela Wax,	*Fraxinus Chinensis*, Roxb.,	82.5°	180.5°
Carramba Wax,	*Copernicia cerefera*, Mart.,	83.5°–84°	182.3°–183.2°
Brazil Wax,	Unknown,	97°	206.6°
Palm Wax,	*Ceroxylon andicola*, Humb.,	100°	212.0°

The production of myrica wax, or bayberry tallow, has been carried on to a somewhat large extent, mostly for the manufacture of candles and soap, generally as described by Toscan in a work entitled *L'Ami de la Nature*. This describes the method employed in an early day.[*] Candles made from this wax, though quite brittle, are less greasy in warm weather, of fine appearance, slightly aromatic, and smokeless after snuffing, rendering them much more pleasant to use than those made of either wax or tallow. Soap from this wax makes an aromatic and very softening shaving lather, and a fine body for surgeons' soap plasters.

Myrica wax, $C_6H_{12}O$,[†] is harder and more brittle than beeswax. Its specific gravity varies from 1.004 to 1.006, and its melting point from 47°-49° (116.6°–120.2° F.). Four-fifths of the wax is soluble in hot alcohol, leaving a residue not soluble; boiling ether dissolves more than one-quarter of its weight, of which, however, nearly all is deposited on cooling; at a moderate heat turpentine dissolves about six per cent.* The wax saponifies readily with a solution of caustic potash, yielding a fragrant soap, fully soluble in water, and breaking down under the action of sulphuric acid into a mixture of fatty acids. Myrica wax, according to G. E. Moore,† is composed of about one-fifth *palmitin*, the remaining four-fifths being free *palmitic* and *lauric* (myristic?) *acids*.

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[*] "Towards the end of autumn, when the berries are ripe, a man leaves his house, together with his family, to go to some island or bank near the seashore where the wax-trees grow in abundance. He carries with him vessels to boil the berries, and a hatchet to build a cottage where he may find shelter during his residence in this place, which is usually three or four weeks. While he cuts down trees his children gather the berries. A very fertile shrub will afford nearly seven pounds. When these are gathered the whole family employ themselves in procuring the wax. They throw a certain quantity of the berries into the kettle, and then pour a sufficient quantity of water on them so as to cover them to a depth of about half a foot. They then boil the whole, stirring the grains about and rubbing them against the sides of the vessel in order that the wax may more easily come off. In a short time it floats on the water like fat, and is collected with a spoon and strained through a coarse cloth to separate it from any impurities which might be mixed with it. When no more wax can be obtained they take the berries out with a skimmer and put others into the same water, but it must be entirely changed the second or third time, and in the meantime boiling water must be added as it evaporates, in order to avoid retarding the operation. When a considerable quantity of wax has been obtained by this means, it is laid on a cloth to drain off the water with which it is still mixed. It is then melted a second time, and it is then formed into masses. Four pounds of berries yield about one of wax; that which is first obtained is generally yellow; but in later boilings it assumes a green color from the pellicle with which the kernel of the berry is covered."

[†] Levy, *Handwörterbuch der Chemie*, v, 413.

Myrica has no place in the U. S. Ph.; in the Eclectic Materia Medica its preparations are: *Cataplasma Myricæ*, *Decoctum Myricæ*, *Extractum Myricæ*, *Lotio Lobeliæ Composita*,‡ *Pulvis Asclepiæ Compositus*,§ and *Pulvis Myricæ Compositus*.||

PART USED AND PREPARATION.—The fresh bark of the root is chopped and pounded to a pulp and weighed. Then two parts by weight of alcohol are taken, the pulp mixed with one-sixth part of it, and the rest of the alcohol added. After having stirred the whole well, pour it into a well-stoppered bottle, and let it stand eight days in a dark, cool place.

The tincture separated from this mass by pressure and filtration should have a deep crimson color by transmitted light, a peculiar vinous odor, a very astringent taste, and strong acid reaction.

CHEMICAL CONSTITUENTS.—*Myricinic Acid.* This body, of unknown composition (bearing, however, great resemblance to myristic acid, $C_{14}H_{28}O_2$, from *Myristica fragrans*, Houtt.), may be obtained from the alcoholic extract of the root-bark by extracting with ether and washing in hot absolute alcohol. The acid then deposits as a granular, acrid mass, producing a dense froth on agitation with water. It fuses at 53.6° (128.4° F.), and is soluble in absolute alcohol.[1]

An acrid resin soluble in alcohol and ether;[1,2] an astringent resin soluble in alcohol;[1,2] volatile oil;[1,3] tannic,[1,2,3] and gallic acids;[1,2,3] starch;[1,2] gum;[1,2,3] and a red coloring-matter,[1,2] have also been determined in the bark of the root.

PHYSIOLOGICAL ACTION.—Myrica, in frequent doses of the extract, causes dizziness; headache; smarting, burning, and soreness of the eyes; burning catarrhal condition of the nostrils; yellowness of the countenance; heat and dryness of the throat; hunger; heat and nausea; distension of the stomach and abdomen, with griping and passage of very offensive flatus; diarrhœa, followed by total absence of stool; incresed secretion of urine, followed by diminished secretion, and even to scantiness; increased heart's action; general languor and depression; sleepiness; chilliness and sensations as of fever.

DESCRIPTION OF PLATE 160.

1. End of female branch, retaining one of the previous year's leaves, Landisville, N. J., May 29th, 1885.
2. Female flower.
3. Male catkin.
4. Portion of a fruiting branch.

(2 and 3 enlarged.)

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* Bostock, *Nicholson's Jour.*, vol. iv, 130.

† *Am. Jour. Sci. and Arts*, vol. xxxiii, 313.

‡ Bayberry bark, Lobelia leaves and seed, Yellow-dock root, and vinegar.

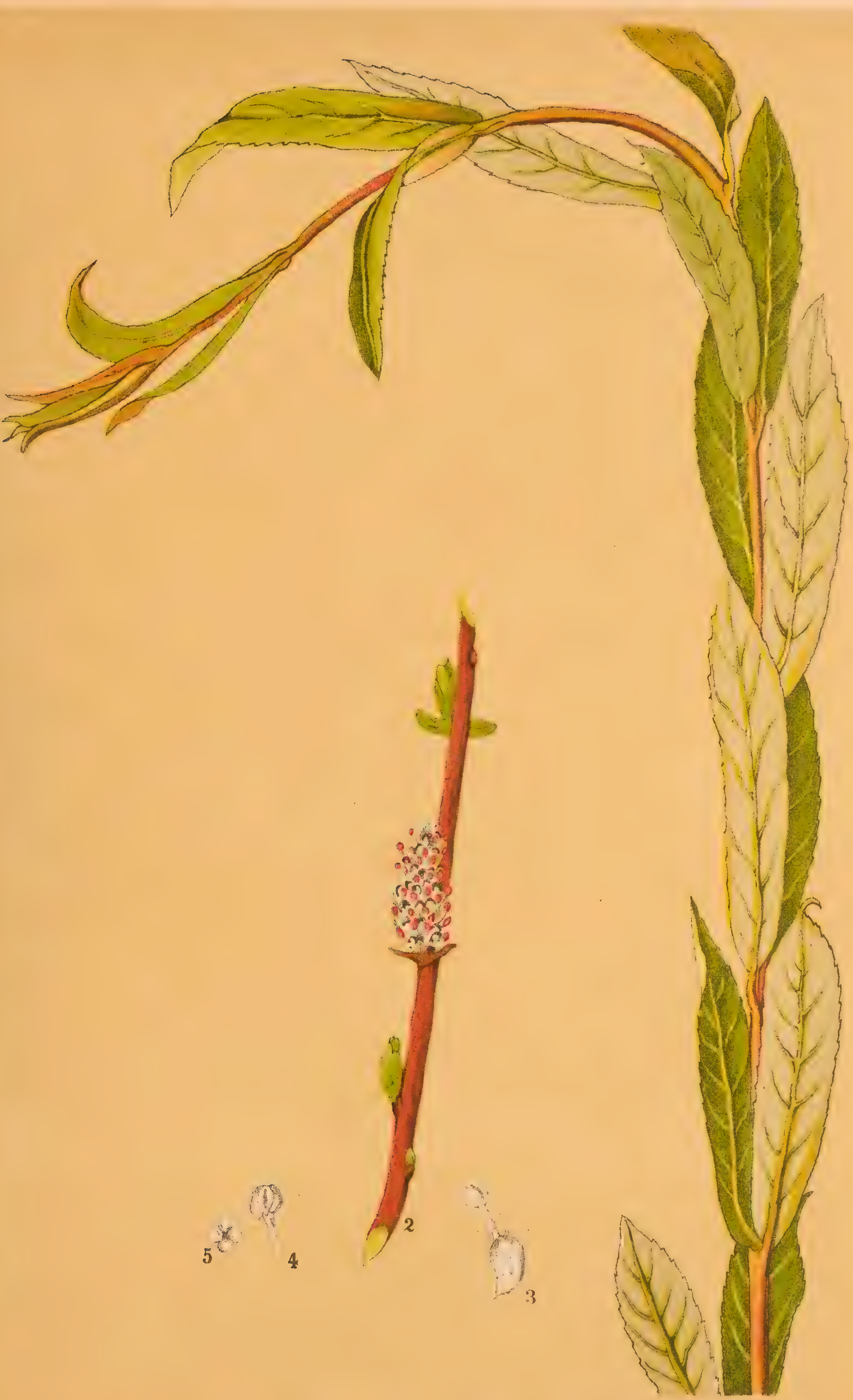
§ Pleurisy root, Spearmint, Sumach berries, Bayberry bark, Skunk Cabbage root, and Ginger.

|| Bayberry bark and Bloodroot.

[1] G. M. Hambright, *Am. Jour. Phar.*, 1863, 193.

[2] Tilden's Analysis, *Jour. Mat. Med.*, N. S., vol. i, 260.

[3] Bigelow, *Am. Med. Bot.*, vol. iii, 34.



CF.M. ad nat del. et pinxt.

SÀLIX PURPÙREA, Linn.

GENUS.—**SALIX,*** TOURN.

SEX. SYST.—DIŒCIA DIANDRIA.

SALIX PURPUREA.

PURPLE WILLOW.

SYN.—SALIX PURPUREA, LINN.; S. HELIX, LINN.; S. MONANDRA, EHR.; S. LAMBERTIANA, PURSH.

COM. NAMES.—BITTER PURPLE WILLOW, RED WILLOW; (GER.) PURPURISHE WEIDE.

A TINCTURE OF THE BARK OF SALIX PURPUREA, L.

Description.—This species only attains a growth of from 6 to 10 feet. *Branches* terete and lithe; *twigs* olivaceous or reddish; *bark* very smooth and bitter. *Leaves* partly opposite on some branches, alternate on others, all oblanceolate, pointed, smooth, minutely and sparingly toothed. *Inflorescence* in lateral, sessile aments appearing before the leaves; *catkins* cylindrical, bracted at the base; *scales* entire, round and concave, very black, more or less hairy, and persistent. *Sterile flowers: stamens* 2; *filaments* united into one, and having a little gland at their base; *anthers* double, 4-celled, reddish. *Fertile flowers: ovary* sessile or nearly so, downy, with a little flat gland on the inner side of the base; *stigmas* 2, nearly sessile, or more properly 1, and emarginate.

Salicaceæ.—This small order is composed of but 2 genera, both of which are represented in North America by a total of 51 species and 29 varieties. Its species are all of the temperate and frigid zones, (*Salix arctica*, Pal.) being found farther north than any other known woody plant. The order is characterized as follows: Trees or shrubs with a bitter bark. *Leaves* alternate, undivided; *stipules* scale-like and deciduous, or leaf-like and persistent. *Inflorescence* amentaceous, the aments from under each bract; *flowers* diœcious; *perianth* wanting. *Sterile flowers* with from 2 to 12 or more stamens, sometimes monadelphous. *Fertile flowers* of a single 1- or imperfectly 2-celled ovary; *style* very short or none. *Fruit* a 2-valved pod; *placentæ* 2. *Seeds* numerous, ascending, provided with a long silky down; *cotyledons* flattened; *albumen* none.

Beside the two species here represented, there are a few others used in medicine, viz.: The European *Salix Russelliana*, Smith, which was considered by Sir James Smith to be the most highly therapeutic of the genus; the European *S. alba*, Linn., is the usual pharmacopœial species; the Sweet Willow of Europe

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* Celtic, *sal*, near; *lis*, water.

(*S. pentandria*, Linn.) is sometimes preferred in decoction on account of its inherent aroma; while *S. Caprea*, Linn., is officinal in the Dublin Pharmacopœia. The leaf-buds of the European Black Poplar (*Populus nigra*, Linn.) are frequently used in the form of *Unguentum Populeum* as a vulnerary; the Lombardy Poplar (*P. dilatata*) is sometimes used as a substitute; and the buds of the Tacmahac Poplar (*P. balsamifera*, Linn.) are considered diuretic and antiscorbutic.

History and Habitat.—The Purple Willow is adventive in this country from Europe. It has become scattered here in many places, on wet meadows, probably by basket-makers, and blossoms in April and May. If the amount of salicin in the willows depends upon the bitterness of the bark, this species should probably furnish more than any other; we will, therefore, give the general action and history of willow under this species, in default of specific literature.

As a bitter tonic and astringent this genus has been used from the time of Dioscorides, but has attracted more attention among medical men since the year 1763, when it was brought forward as a remedy for fevers of an intermittent character. The bitterness of the bark makes it an excellent stomachic tonic, but its control over fever was never very satisfactory. Its principal utility has been found to be as an astringent tonic in convalescence from protracted diseases, atony of the digestive tract, chlorosis, chronic diarrhœa, dysentery, leucorrhœa, and kindred affections. Salicin itself appears to have a more thorough and effective action than the bark, but still cannot cover the generality of cases like quinine; it is, however, very useful in such cases of hectic fever and of diarrhœa where irritation and inflammation precludes the use of quinine.

The bark of Salix (various species) is officinal in the U. S. Ph., as is also Salicin.

PART USED AND PREPARATION.—The fresh bark, gathered during the budding season, is chopped and pounded to a pulp and weighed. Then two parts by weight of alcohol are taken, the pulp thoroughly mixed with one-sixth part of it, and the rest of the alcohol added. The whole is then poured into a well-stoppered bottle, and allowed to macerate for eight days in a dark, cool place.

The tincture thus prepared is, after straining and filtering, opaque. In thin layers it has a deep crimson color; its odor is sweet and balsamic; its taste extremely astringent, snuff-like, and bitter; and its reaction acid.

CHEMICAL CONSTITUENTS.—*Salicin*, $C_{13}H_{18}O_7$. This glucoside of the aromatic group, is found in the young bark of all species of this order, as well as in *Castoreum*, the preputial follicles of the beaver (*Castor Fiber*, Linn.). It was discovered by M. Buchner in 1828,[*] and two years afterward detected by M. Leroux,[†] though its first isolation from this species was by M. Becker.[‡] Pure salicin crystallizes in colorless prisms melting at 198° (388.4° F.), and decomposes at higher temperatures, yielding a resin, water, and salicylous acid. It possesses a bitter taste, and is soluble in 28 parts of cold water and in 30 parts of alcohol.

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[*] *Jour. de Phar.*, xvi, 242.

[†] *Ann. de Chim. et de Phys.*, xliii, 440.

[‡] *Ann. der Phar.*, iv, 33.

Saligenin, or *Oxybenzyl Alcohol,* $C_7H_8O_2$, is obtained by acting upon an aqueous solution of salicin at 80° (176.0° F.) with saliva or emulsion:

$$\underset{\text{Salicin.}}{C_{13}H_{18}O_7} + \underset{\text{Water.}}{H_2O} = \underset{\text{Glucose.}}{C_6H_{12}O_6} + \underset{\text{Saligenin.}}{C_7H_8O_2}.$$

Saligenin results in small, brilliant rhombic plates, that melt at 82° (179.6° F.) and sublime above 100° (212° F.). It is soluble in alcohol and in hot water.

Saliretin, $C_{14}H_{14}O_3$, one of the oxybenzyl compounds, is formed by heating salicin with hydrochloric acid. It results as a yellowish amorphous powder.

Helecin, $C_{10}H_{16}O_7$.—This glucoside may be obtained by oxidizing salicin or saligenin with dilute nitric acid. It results as crystals, having a slightly bitter taste.

Salicylous Acid, or *Salicylaldehyde,* $C_7H_6O_2$, exists naturally in the leaves of the Meadow-sweet (*Spirea Ulmaria*). It can be obtained from salicin by distillation with dilute sulphuric acid and potassium dichromate. It results as a fragrant, colorless, oily liquid, having an odor similar to that of almond oil, and a burning aromatic taste; it boils at 196° (384.8° F.); congeals at 20° (−4° F.) into a translucent crystalline mass; has an acid reaction to litmus; and is soluble in water and alcohol.

[**Salicylic acid,** $C_7H_6O_3$, is a by-product of the above distillation, and only differs chemically from salicylous acid in having one atom more of oxygen in its composition.] (*Et supra,* Schorlemmer, Wittstein, Thomson.)

Tannin, resin, gum, sugar, and other general plant constituents are also present.

PHYSIOLOGICAL ACTION.—The symptoms caused in Dr. Duncan's experiments with the drug are concisely as follows:* Nervousness and irritability; giddiness; swelling of right parotid gland; painful flatulence; diarrhœa; pain in right hip; feeble pulse; sleeplessness; and alternate heat and coldness followed by morning perspiration.

DESCRIPTION OF PLATE 161.

1. End of a leafing branch.
2. A twig in flower, Ithaca, N. Y., May 10th, 1886.
3. Scale and stamen.
4. Stamen.
5. Double anther.

(3–5 enlarged.)

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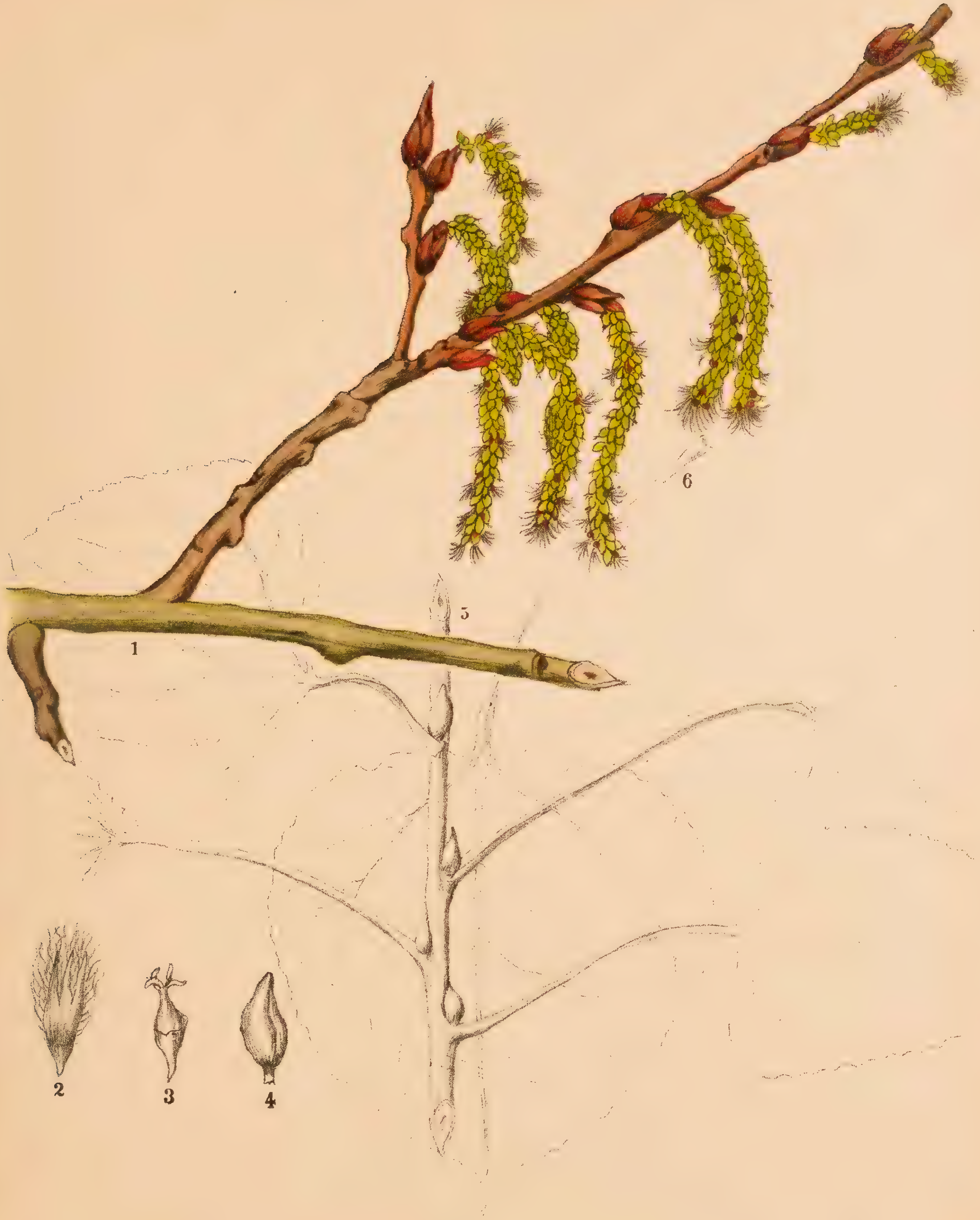
* *Trans. Hom. Med. Socy.*, N. Y., 1870, 328.



CFm. ad nat. del. et pinxt.

PÓPULUS TREMULOÌDES, Michx.

GENUS.—**POPULUS**,* TOURN.

SEX. SYST.—DIŒCIA OCTANDRIA.

POPULUS.

AMERICAN ASPEN.

SYN.—POPULUS TREMULOIDES, MICHX.

COM. NAMES.—AMERICAN ASPEN† OR POPLAR;‡ UPLAND OR WHITE POPLAR;§ POPLE; (GER.) PAPPEL.

A TINCTURE OF THE FRESH INNER BARK OF POPULUS TREMULOIDES, MICHX.

Description.—This upland tree seldom reaches a height of over 40 feet. *Bark* smooth and greenish-white, except that of the old trunks; *branches* somewhat angular; *buds* large, scaly, and covered with a reddish-brown resinous varnish. *Leaves* orbicular-cordate, mostly broader than long, smooth and dark-green on both sides, and tipped with a short, sharp point; *serrations* small, nearly regular; *margin* downy; *petiole* long and slender, laterally compressed to such extent as to make it nearly ancipital. This position of the flattened petiole at right angles to the leaf-blade accounts for the agitation of the leaf during the slightest zephyr. *Inflorescence* diœcious, the male and female flowers in long, axillary, drooping, loosely imbricated aments, appearing before the leaves; *scales* oblong, cuneate, laciniate-lobed; *lobes* 3 to 4 linear, pointed, the margins fringed with long cilia; *flowers* one to each scale, springing from a calyx-like urceolate torus, which is obliquely truncated anteriorly. *Stamens* about 12; *filaments* distinct, capillary; *anthers* large and drooping, more or less quadrangular in form. *Style* none; *stigmas* 2, elongated, sessile, each bifurcating into linear lobes. *Fruit* an oblong or oblong-ovoid, pointed, 1-celled capsule, distinctly raised upon a peduncle; *seeds* ovate, numerous, minute, covered with a copious wool.

History and Habitat.—This beautiful white-trunked forest-tree, whose leaves have become the synonym of trembling, is indigenous to most parts of North America, where it is common on hillsides and in open forests. It blossoms in March or April, and fruits before the leaves are developed in May. Its wood is light and of an inferior quality, except for the lighter household utensils and the manufacture of certain chip hats. The Cree Indians—according to Mr. Walter Haydon, who has resided for some time in the Hudson Bay territory—esteem the inner bark (which they call *Metoos*) for food in early spring, considering it also as a gentle laxative and remedy for coughs. Mr. Haydon says he has eaten pounds of it without ill effects. It is very tender and sweet, and has a pleasant flavor.* The leaves and young shoots of Poplar are said to be gathered in Sweden and kept for sheep fodder in winter—a practice as old as the time of the Romans. In Kamtchatka the inner bark is used for making into bread in times of scarcity.

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* The ancient name, *Arbor Populi*, from its having been planted to shade the public walks; or, according to Bullet, because the constant motion of the leaves resembles that of the populace.

† Or *asp*, from the German *espe*, a generic vulgarism.

‡ Sometimes applied to the Yellow Poplar or Tulip tree, *Liriodendron tulipifera* (Magnoliaceæ).

§ The white poplar is properly the British Abele, *Populus alba*, Linn.

The previous uses of Poplar bark in medicine are all embodied in the following paragraph from Dr. C. A. Lee's article on "Indigenous Tonics:"† "The therapeutical properties of the Poplar are supposed to be nearly, if not quite, identical with those of the willow. As an anti-periodic, it has been used successfully in the treatment of intermittents, and also as an ordinary tonic, where such remedies are indicated. We have good reason for believing that its tonic properties are considerably superior to those of salix; especially its anti-periodic power, and that there are few indigenous tonics superior to it in a certain class of cases, especially intermittents. As a stomachic tonic, the tincture has been extensively used in domestic practice, and with satisfactory effects; also, as a vermifuge. It is thought by many to possess decided alterative properties, and those who have watched its effects closely, consider it diuretic, diaphoretic and a general depurant. It has been strongly recommended in jaundice, and in suppression and retention of urine."

PART USED AND PREPARATION.—The fresh inner bark, gathered as the leaves are falling, is treated as in the preceding drug. The resulting tincture is opaque in layers of an inch or more. In thin layers it is of a beautiful, deep, brownish-crimson color by transmitted light; its odor is rich and woody; its taste extremely bitter and astringent, the sensation lasting a long time without losing its intensity; and its reaction acid.

CHEMICAL CONSTITUENTS.—*Populin*, $C_{20}H_{22}O_8(H_2O)$. This aromatic glucoside was determined by Braconnot in 1830.‡ It exists in company with *salicin* in the bark and especially the leaves, from which it may be separated by precipitating it with the carbonate of potassium from the aqueous solution. Populin crystallizes in very light, white, satiny, voluminous needles, having a bitterish-sweet licorice-like taste. It loses all its water of crystallization at 100° (212° F.), fuses at 180° (356° F.), and decomposes at higher temperatures, yielding benzoic acid. The crystals are only slightly soluble in water, more so in alcohol, and readily in dilute mineral, and acetic acids. Upon boiling with baryta water it breaks down into *salicin* and benzoic acid, and in dilute sulphuric acid into benzoic acid, glucose, and *saliretin*. This body is very similar in its properties and reactions to *salicin*, from which it seems to differ only in being in intimate combination with benzoic acid.

$$\overset{\text{Salicin.}}{C_{13}H_{18}O_7} + \overset{\text{Benzoic Acid.}}{C_7H_6O_2} = \overset{\text{Populin.}}{C_{20}H_{22}O_8(H_2O)}.$$

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* Holmes, in *Am. Jour. Phar.*, 1884, p. 619.

† *The Jour. of Mat. Med.*, Vol. II, N. S., 1860, p. 364.

‡ *Ann. de Chim. et de Phys.*, Vol. XLIV, 296.

Oil of Populus.—This body, obtained by aqueous distillation of the leaf buds, is colorless, lighter than water, and has a pleasant balsamic odor. The name *Tacamahaca* has been improperly applied to this product, to which, however, it bears no resemblance except, mayhap, in its odor.* The name was probably applied here on account of the oil having been extracted from the buds of the Balsam Poplar or Tacamahac (*Populus balsamifera*, Linn.).

Salicin,† starch, resin, and gum have also been determined.

PHYSIOLOGICAL ACTION.—Very few symptoms have as yet been credited to this drug, our experience with it being mostly clinical. Poplar bark, however, causes increased secretion of urine, nausea and vomiting, slight purging of bilious matters, and burning in the stomach.‡

Description of Plate 162.

1. A branchlet with half-ripe fruits, from Binghamton, N. Y., May 5, 1885.
2. A scale.
3. Pistil.
4. Fruit.
5. End of leafy branch.
6. A leaf.

(2-4 enlarged.)

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* *Tacamahaca* is a solid resinous product of the South American *Elaphrium tomentosum*, Jacq. (Burceraceæ.)

† See preceding plant, 161.

‡ Dr. Hale, *N. Am. Jour. Hom.*, 1867, p. 391.

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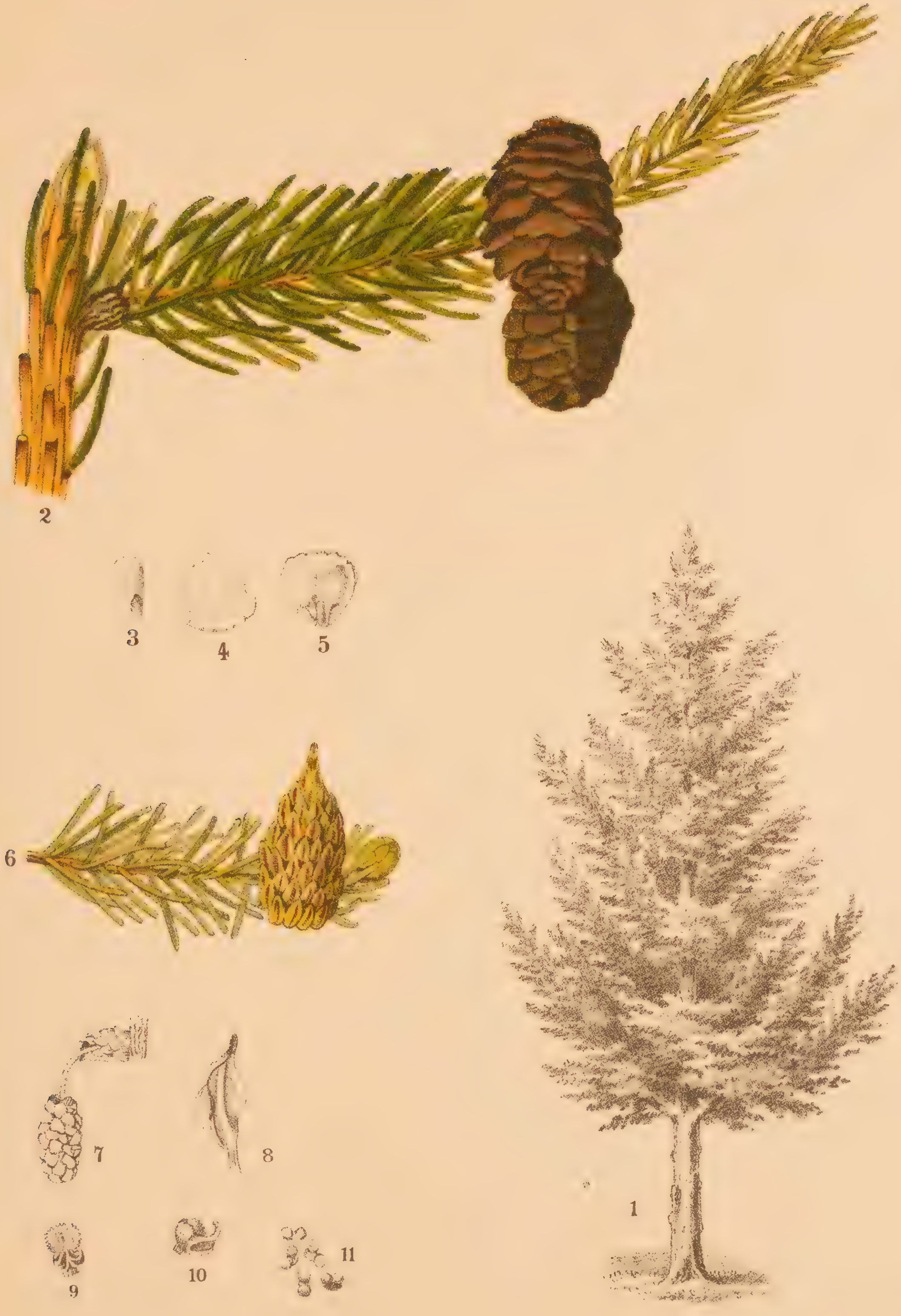

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ÀBIES NÌGRA, Poir.

S. ORD.—*Abietineæ.*

GENUS.—**ABIES**,* TOURN.

SEX. SYST.—MONŒCIA MONADELPHIA.

ABIES NIGRA.

BLACK SPRUCE.

SYN.—ABIES NIGRA, POIR.; PINUS NIGRA, AIT.; ABIES DENTICULATA, MICHX.; PINUS RUBRA, LAMB.

COM. NAMES.—BLACK SPRUCE, DOUBLE SPRUCE; (GER.) SCHWARTZTANNE.

A TINCTURE OF THE GUM EXUDATION OF THE TRUNK OF ABIES NIGRA, POIR.

Description.—This beautiful evergreen tree attains a growth varying between 30 and 70 feet in height, and 15 to 50 feet in breadth at the base. *Leaves* acerose, short, quadrilateral, very dark green, and projecting in all directions. *Anthers* tipped with a rounded, recurved appendage; *pollen* similar to that of *Pinus*—*i. e.*, of three united grains.† *Cones* ¾ to 1½ inch long, ovate or ovate-oblong, mostly recurved, persistent, hanging from or near the ends of the branches especially at the summit of the tree; *scales* thin, rigid, persistent on the axis; *edges* generally eroded; *seeds* and their wings about two-thirds the length of the scale.

Abies.—This, the genus Abies of Linnæus, Tournefort and others, is synonymous with Picea of Link, but not with the genus Picea of Linnæus. It is characterized as follows: *Buds* scaly; *leaves* short, persistent, all of one form and foliaceous, scattered, or more or less 2-ranked, never fascicled. *Flowers* monœcious. *Fertile catkins* lateral or terminal on the branches of the preceding year; *sterile catkins* scattered, or sometimes clustered, in the axils of the leaves of the previous year's growth. *Cones* pendent, at the base of the new growth of the season; *scales* or flat open *carpels* imbricate, thin and even (not prickly-tipped nor thickened), situated in the axil of a bract; *bracts* subtending the scales, very small. *Seeds* 2, inverted, adhering to the base of each scale; *foramen* looking downward; *testa* smooth, coriaceous or ligneous; *wing* membranaceous. *Embryo* in the axis of the albumen; *albumen* sarcous or oleaceous; *cotyledons* 2 to 15.

Coniferæ.—This superb and wide-spread family is composed of evergreen (Ex. Larix) trees or shrubs, with branching, generally excurrent, trunks, rich in gummy or resinous juice. *Wood* somewhat intermediate between woody fibre and vessels, and marked in circular disks. *Leaves* scattered or fascicled, sometimes opposite, linear, awl-shaped or acerose, rigid, and generally evergreen. *Inflorescence* amentaceous; *flowers* monœcious or diœcious, destitute of calyx or corolla. *Fertile flowers: pistils* absent, or represented by an open scale or metamorphosed leaf; *sterile flowers* consisting of one or more stamens; *stamens* generally monadelphous, situated upon an axis, thus forming a loose, deciduous catkin or spike. *Fruit* varying greatly in the different tribes, from a hard, bony nut with an edible "meat," to a soft, edible drupe. *Carpels* either wanting or represented by an open scale; *ovules* orthotropous, naked, not enclosed in an ovary; *embryo* consisting of a pair of opposite, or several whorled cotyledons.

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* The classical Latin name.

† Or a single grain with bulged extremities, sometimes described as two grains with a curved connective.

This family of plants is one producing many valuable drugs, useful exudations, varied woods, and ornamental trees. Of the drugs, exudations, and constituents, the turpentines, balsams, and pitches rank highest. They are in general as follows: The common European and Russian turpentines, *Terebinthina vulgaris*, are derived from *Pinus sylvestris*, Linn.; the common American turpentine, *Terebinthina vulgaris*, together with common frankincense, *Thus Americana*, a concrete oleo-resin, and *Oleum Terebinthinæ*, from *Pinus australis*, Michx. (*P. palustris*, Mill.), and *Pinus Tæda*, Linn.; Canada balsam and *Terebinthina Canadensis*, from *Abies balsamea*, Marsh. (*A. balsamifera*, Michx.; *Pinus balsamea*, Linn.; *Picea balsamea*, Loud.), and from *Pinus Frazeri;* while Canada pitch, *Pix Canadensis*, is yielded by *Abies Canadensis*, Michx. Austrian turpentine is derived from *Pinus Laricio*, Poir.; Bordeaux turpentine, or galipot, from *Pinus pinaster*, Ait. (*P. maritima*, DC.); Strasburgh turpentine, *Terebinthina argentoratensis*, from *Pinus Picea*, Linn. (*Abies Picea*, Lindl.; *Abies pectinata*, DC.); Venice turpentine, *Terebinthina Veneta* or *laricinia*, from the European *Abies Larix*, Lam. (*Pinus Larix*, Linn., *Larix Europæa*, DC.); Pacific coast turpentine from *Abies Menziesii*, Lindl.; Damarra turpentine from *Damarra australis;* and the Chilian Dombeya turpentine from *Dombeya excelsa*. Hungarian balsam, *Balsamum Hungaricum*, is a product of *Pinus Pumilio*, Willd.; and Carpathian balsam of *Pinus Cembra*, Linn., and *Pinus pinea*. Burgundy pitch, *Pix Burgundica*, is derived from *Abies excelsa*, DC. (*Pinus Abies*, Linn.); while *Pix Nigra* or *Arida*, together with *Pix Liquida*, otherwise known as Archangel or Stockholm tar, are obtained upon destructive distillation of various coniferous roots, but especially those of *Pinus sylvestris*, Linn., and *Pinus Ledebourii*, Endl. (*Larix Sibirica*, Ledeb.). Rosin, *Resin* or *Colophony*, is the residue after the distillation of volatile oil from the turpentine of *Pinus palustris*, Mill., and other species. Juniper tar, *Pyroleum Oxycedri* or *Oleum Cadinum*, is a product of the Cade (*Juniperus oxycedrus*, Linn.). Morocco, or Barbarian Sandarach, is obtained from *Callitris quadrivalvis*, Vent. Rich. (*Thuja articulata*, Desf.); *Gummi Orenburgense* and Manna of Briançon from *Abies Larix*, Lam.; Oil of Savin from *Juniperus Sabina*, Linn.; and *Fructus Juniperi* from *Juniperus Virginiana*, Linn. Edible nuts are produced by *Pinus pinea*, *Pinus Cembra*, and *Pinus Lambertiana;* edible drupes by *Taxus baccata*, and beverages by *Abies nigra*, in America, and *Dacydium taxifolium*, in New Zealand.

We have provings in the Homœopathic Materia Medica of the Scotch fir, *Pinus sylvestris;* the sugar-pine, *Pinus Lambertiana;* savin, *Juniperus Sabina*, and of *Cupressus australis*, besides those members of the order treated of in this work.

History and Habitat.—Abies nigra is a native of the Northern States of America, as far west as Wisconsin, and of the Canadas and British America, where it flowers in early spring and matures its fruit in autumn. The black spruce greatly resembles the Norway spruce (*Abies excelsa*, Lindl.) in its growth, and is judged by many prominent arborists and arboriculturists to be much more graceful in the drooping curves of its branches and the luxuriance of its foliage; its twin species, the white spruce (*Abies alba*, Michx.), is certainly one of the very finest of all evergreens.

Concerning the uses of this tree, and other American spruces, Rafinesque says,* "The bark of spruce trees is sudorific, and in extensive use for tanning leather,† also to dye of a brick-red color. The inner bark is used by empirics, in powder and tea, for bowel and stomach complaints, rheumatism, and gravel. The timber is valuable for masts and spars," in fact the most valuable we have for use in this direction. "The resin exuding from the trees is nearly like frankincense. Josselin says that it is very good in powder over wounds to reproduce the flesh. Spruce beer is an American beverage, made by the Indians with twigs and cones of spruces, boiled in maple syrup. Now it is chiefly made with molasses and yeast; when no spruce is put in, it is only molasses beer. The proper spruce beer is a palatable and healthy drink, powerfully antiscorbutic. The discoverers of Canada were cured of the scurvy by it, since which it has become in common use in Canada, the Northern States, and even in Europe. The essence of spruce‡ is an article of exportation, used as naval stores; spruce beer may be made by it in a short time, and anywhere."§

Abies nigra has no officinal recognizance in the Pharmacopœias.

PART USED AND PREPARATION.—Take two parts by weight of the gum, dissolve in nine parts of 95 per cent. alcohol, and filter. This tincture has a beautiful orange color by transmitted light, the full odor and taste of raw spruce gum, and an acid reaction.

CHEMICAL CONSTITUENTS.—The resin of this species is scanty and insufficient to produce pitch or turpentine in marketable quantity. The "essence of spruce," before mentioned, probably contains an essential oil. The tincture contains a large quantity of resin; more in fact than that of Abies Canadensis. The specific chemical bodies and properties are unknown.

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* *Medical Flora*, vol. 2, p. 183.

† *Abies Canadensis*, Michx., Hemlock spruce.

‡ A concentrated aqueous decoction of the young twigs.

§ Spruce beer may be made from the extract as follows: Take one part of essence of spruce and seventy-six parts of water, boil, strain, allow to cool, and add ninety-six parts warm water, seven parts molasses and one part of yeast. Allow the mixture to ferment, and bottle strongly while fermenting.

PHYSIOLOGICAL ACTION.—Our proving of this drug by Dr. Leaman,[*] though exhibiting a few quite specific symptoms, does not afford an insight into the primary action upon the system.

Description of Plate 163.

1. Distant view of tree, Binghamton, N. Y.
2. Branch-tip, with winter cones.
3. Seed.
4. Outer aspect of scale.
5. Inner aspect of scale, one seed gone.
6. End of branch, with female catkin.
7. Male catkin.
8. Fertile flower from female catkin.
9. Face view of ruptured anther-cell, with its scale (enlarged).
10. Profile of same (enlarged).
11. Pollen x 150.

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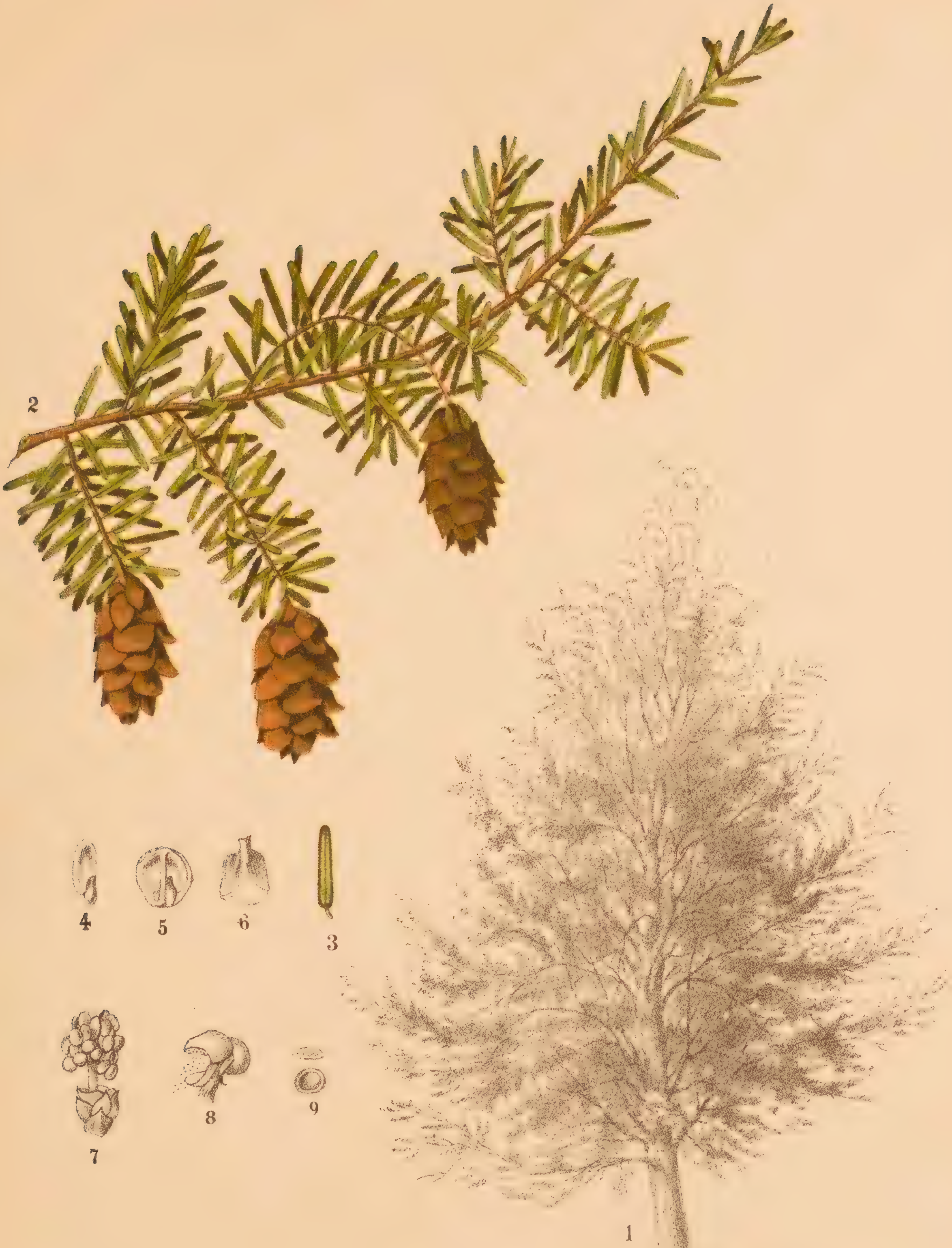
[*] *Ohio Med. and Surg. Rep.*, I.



C.M.: ad nat del. et pinxt.

ÀBIES CANADÉNSIS, Michx.

N. ORD. CONIFERÆ. 164

S. Ord.—ABIETINEÆ.

GENUS.—**ABIES**, TOURN.

SEX. SYST.—MONŒCIA MONADÆLPHIA.

ABIES CANADENSIS.

HEMLOCK.

SYN.—ABIES CANADENSIS, MICHX.; PINUS CANADENSIS, WILLD., LINN.; PINUS-ABIES CANADENSIS, MARSH.

COM. NAMES.—HEMLOCK, HEMLOCK-SPRUCE, HEMLOCK-FIR; (GER.) CANADISCHE EDELTANNE.

A TINCTURE OF THE FRESH BARK AND YOUNG BUDS OF ABIES CANADENSIS, MICHX.

Description.—This evergreen forest tree attains a height of from 60 to 80 feet, and a width of 40 to 60. *Trunk* 2 to 3 or more feet in diameter, excurrent but tending to deliquescence; *wood* coarse and poor, it weighs 23 lbs. per cubic foot and has a sp. gr. of .384; *branches* horizontal,* the uppermost pendulous at their apices. *Leaves* stiff, short, flat, linear, obtuse, irregularly crowded, but mostly spreading in two directions, thus appearing 2-ranked; they are dark, rich, glossy green above, and whitish by a single silvery line each side of the midrib underneath, making a branch upturned by the wind appear silvery-white; *petioles* short and slender. *Sterile aments* small, globose, composed of a few stamens, and surrounded at the base of the column by a few erect, brownish scales; *filaments* short; *anthers* capitate, with an apiculate crest; *cells* 2, confluent; *dehiscence* transverse; *pollen* simple, saucer-shaped. *Cones* ovoid, persistent, small, ½ to 1 inch long, pendent on the ends of the declined branchlets of the preceding year; *scales* few, thin, markedly imbricate, obtuse, ligneous, with a coriaceous edge; longer than the bracts and persistent on the axis; *bracts* broadly ovate, truncate. *Seeds* with a long, thin, membranaceous *wing*, greatly resembling in outline that of the fly. Read Abies and Coniferæ, under the preceding drug.

History and Habitat.—This common native tree is, when young, the most graceful of our evergreens. It is hardy, yet delicate in its outline, its feathery-tipped branches reminding one of the plumose ends of a bouquet of pampas grasses. When old it grows more rugged and sombre, but increases in the picturesque. Its foliage is soft to the hand, beautiful in sunshine and shadow, and rests the snow-blinded eye with that peace that verdure resplendent in light and shade alone can give. Hemlock-spruce abounds in the northern United States, the Canadas and British America, extending a little farther south than the black-spruce, with which it forms immense forests in the north. It flowers in May and ripens its cones in autumn.

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* My father, an excellent artist and etcher, kindly sketched, at my instigation, the trees in Plates 164 and 165. In this figure he unfortunately allowed his ideas of the picturesque, to somewhat supersede mine of the horizontality, of the branches.

Hemlock bark is largely used in tanning; though inferior to oak, its greater abundance predominates in its favor in this country. The timber, as before hinted, is very coarse-grained and poor, yet in thoroughly-protected places it is very durable; in carpentry it is used extensively for joists, scantling, girders and sub-flooring.

The stimulating effect of hemlock is well known and greatly utilized. A tired hunter arises fresh and invigorated from his bed of hemlock boughs, and the patient of the city physician, seeking health in our northern interiors, finds supreme comfort in a bath, in which hemlock leaves have been slowly steeping for some hours before his ablution, and quiet, refreshing slumber awaits him upon his couch of soft branches. A strong decoction of hemlock bark has received the praise of empirics and the laity as an astringent enema in diarrhœa and injection for leucorrhœa, prolapsus uteri, etc.; the oil as a liniment in croup, rheumatismus and other disorders requiring its stimulant action; and the essence as a diuretic and a remedy to allay gastric irritation and colic, and to correct acidity of the stomach. A decoction of the bark has been used to produce abortion with dangerous effects, tending toward serious peritonitis. Pregnant ewes are said to lose their lambs from gnawing the bark of the hemlock.

The officinal part of this species in the U. S. Ph. is *Pix Canadensis;* its preparation *Emplastrum Picis Canadensis.*

PART USED AND PREPARATION.—The fresh bark and young buds are pounded to a pulp and weighed. Then two parts by weight of alcohol are taken, and after mixing the pulp thoroughly with one-sixth part of it, the rest of the alcohol is added. After stirring the whole well, it is poured into a well-stoppered bottle and allowed to stand eight days in a dark, cool place. The tincture, separated by filtering, should be opaque in quantity, and show a deep, reddish, orange-brown color in thin layers; it should retain the exact odor and taste of the bruised leaves and branches, and exhibit a strongly acid reaction.

CHEMICAL CONSTITUENTS.—*Pix Canadensis* (Hemlock pitch, Hemlock gum, Canada pitch). This substance, the prepared resinous exudation from the trunk of the hemlock, is hard and brittle in cold weather, soft and conforming in the warmer seasons, and melts at 198° (388.4° F.). It is of a dark yellow-brown color when fresh, but oxidizes and becomes almost black on exposure. It contains a resin, and a volatile oil, uninvestigated, but supposed to be similar to the turpentine obtained from *Abies balsamea.*

Oil of Hemlock* (oil of spruce). This essential oil is obtained on distillation of the leaves, a process carried on to a large extent in some portions of the State of New York.

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* *Ut supra*, Flück. & Han. Pharmacographia.

As far as I can determine, this tree has not been specifically examined as to its constituents.

PHYSIOLOGICAL ACTION.—Abies Canadensis causes, according to Gatchell,* vertigo and weakness; great hunger, with burning and distention of the abdomen; thirst; increased heart's action; restlessness and chilliness; the urine is increased and of a straw-color. The drug appears to cause a torpor of the liver, resulting in a diminished secretion of bile, pain in the right shoulder-blade, and constipation.

Description of Plate 164.

1. Tree, Binghamton, N. Y.
2. A winter spray in fruit.
3. Leaf, under surface.
4. Seed (slightly enlarged).
5. Inner face of a scale, with one seed removed.
6. Outer view of a scale.
7. Male catkin (enlarged).
8. Stamen (enlarged), showing the dehiscence of the anther-cell.
9. Pollen, two views, x 200.

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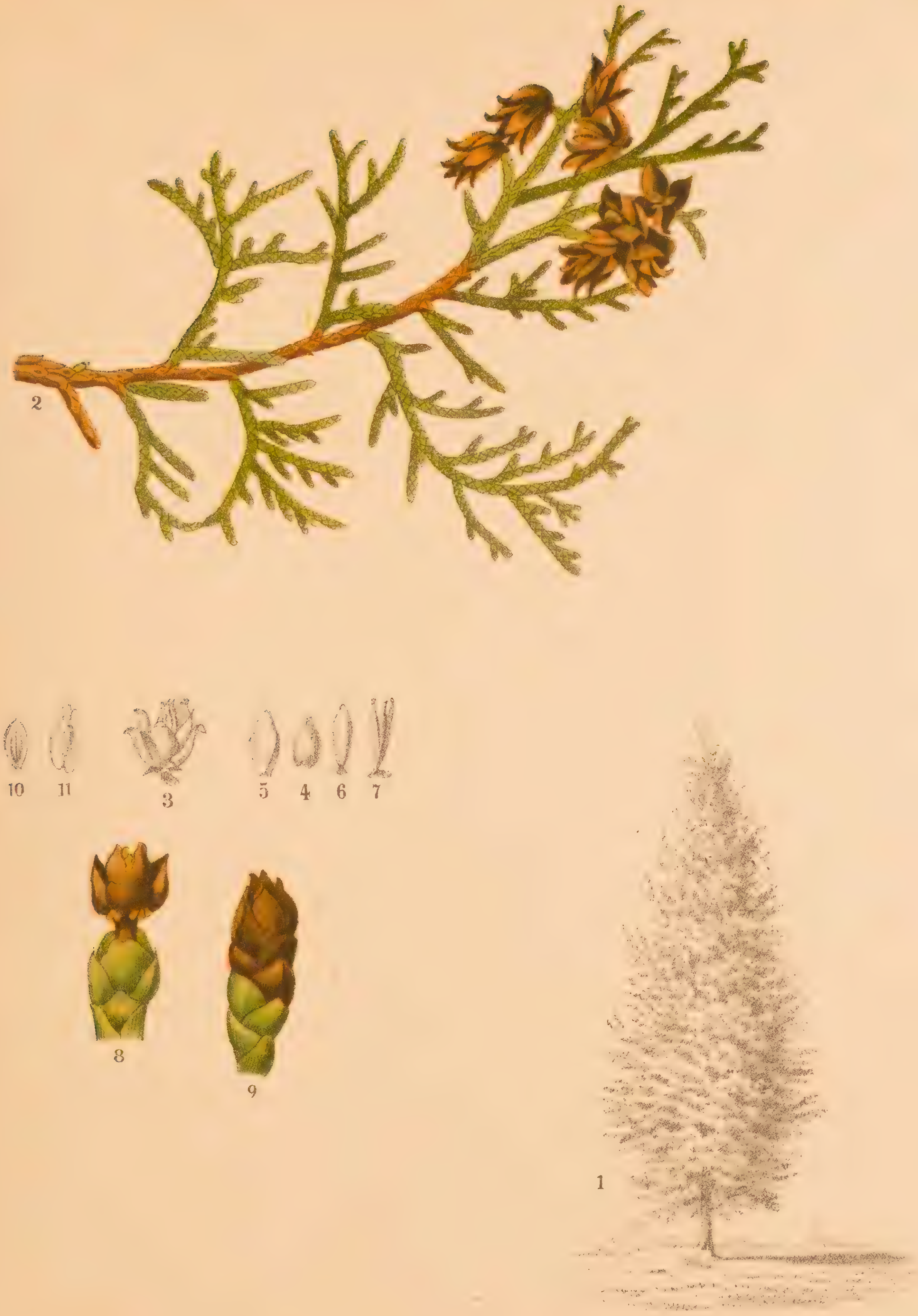
* Hale, *New Rem.*, 4th ed., pp. 17 and 18.



CM. ad nat. del. et pinxt.

THÙJA OCCIDENTÀLIS, Linn.

N. ORD.—CONIFERÆ.

S. ORD.—CUPRESSINEÆ.

GENUS.—**THUJA**,* TOURN.

SEX. SYST.—MONŒCIA MONADELPHIA.

THUJA.

AMERICAN ARBOR VITÆ.

SYN.—THUJA OCCIDENTALIS, LINN.; CEDRUS LYCEA, GER.

COM. NAMES.—AMERICAN ARBOR VITÆ, WESTERN ARBOR VITÆ, TREE OF LIFE, WHITE CEDAR,† HACKMATACK,‡ THUJA; (FR.) THUIA DU CANADA; (GER.) LEBENSBAUM.

A TINCTURE OF THE FRESH YOUNG TWIGS, LEAVES, AND BLOSSOMS OF THUJA OCCIDENTALIS, LINN.

Description.—This spiry evergreen attains a height of from 20 to 50 feet, though generally not above 40, and a diameter of about 10 to 20 feet through the greatest breadth of foliage. *Sprays* or *branchlets* very flat, spreading, and ancipital. *Leaves* small, appressed, tightly imbricated in 4 rows, persistent. They are of two kinds on alternate or separated branchlets; one form is awl-shaped; the other short, squamose, and obtuse; both forms have a small flattened dorsal gland, filled with a thin aromatic turpentine. *Inflorescence* minute, terminal, ovoid aments; *flowers* monœcious on different branchlets; *fertile aments* composed of a few imbricated scales. *Filaments* forming scale-like connectives, bearing 4 concave anther-cells. *Cones* nodding, ovoid before ripening, spreading or gaping when mature; *scales* blunt, arranged in three rows of two scales each, attached to the rhachis by their bases, the outer pair seedless; *rhachis* composed of three nearly separate metamorphosed scales, each tipped with a rounded stigma-form body (Fig. 7). *Seeds* 6, double-winged, 2 in each of the second pair of scales,

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* Concerning the etymology of Thuja, Dr. Mayrhoffer says (Essay on Thuja occidentalis, *Metcalf's Provings*, N. Y., 1853): "In the time of Francis I, king of France, this tree was imported into France from Canada. The first specimen was seen by Clusius in the royal garden of Fontainebleau, and a tolerably correct figure and description of it were furnished by him under the name of *arbor vitæ*. (Caroli Clusii Rarior. Plantar. Histor., 1601.) The Greek name ϑύα, also ϑύεια or ϑύια, from ϑύειν, *suffre*, to fumigate, points to a resinous tree, and is first seen in Theophrastus Lesbius, a disciple of Aristotle. In his work, 'περι φυτων ἱστοριας,' he describes a tree resembling the cypress, and called ϑύον (δένδρον) or ϑύα (ἰδεα, *species*). Roman authors Latinized the word ϑὺα, changing it to Thya, Thuya, Thuia, Thuja, as ϑύς, gen. ϑύεος, was changed to *thus*, gen. *thuris*, and the word κυπαρισσος, to *cupressus*. The native region of the Thuja of Theophrastus, according to his account, is the territory of Cyrene, in Africa, and especially the region in which the temple of Jupiter Ammon was situated; whereas our Thuja is a native of North America." It would seem by this that the Thuja of Theophrastus is *Thuja articulata*, Vahl., a native of Barbary.

† The true white cedar is *Cupressus thyoides*, Linn.

‡ The hackmatack is *Larix Americana*, Michx.

1 in each of the inner pair;[*] *wings* lateral, equal; apparently emarginate, but on close inspection it will be seen that one wing is attached to the seed on a higher plane than the other (Fig. 11). *Cotyledons* 2. Read description of Coniferæ, under Abies nigra, 163.

History and Habitat.—This beautiful native tree abounds in the upper zones of North America, from the State of Pennsylvania northward, where it often forms what are commonly known as cedar-swamps. It grows upon the rocky banks of rivers and in low, swampy spots, blossoming from May until June, and maturing its fruit in autumn. The Arbor Vitæ assumes a conical form with such true lines as to appear "clipped," thus forming one of our most valued high-hedge trees. Its use in this direction is enhanced by the fact that it bears the shears well, and remains in full foliage, and beautiful, in any form to which it may be cut. The wood is light and soft, but extremely durable; it is seldom used, however, on account of the smallness of the trunk affording lumber of no useful size. There are four other species of this genus out of cultivation, viz.: the Chinese *Thuja orientalis*, the Javanese *Thuja dolabrata*, the Barbarian *Thuja articulata*, and the *Thuja cupressoides* of the Cape of Good Hope.

Concerning the previous medical uses of this plant, Rafinesque covers it almost fully in stating:[†] "Ointment of fresh leaves with bear's fat, excellent for rheumatism; decoction useful in coughs, fevers, cacœhyma, scurvy, gout, etc.; distilled water for dropsy; poultices of the cones and *polypodium*,[‡] in powder with milk, remove the worst rheumatic pains." Farther uses are given in later works. The most striking to us as homœopaths is that of an application of the tincture to venereal warts (condylomata), which it removes in from three to four weeks. This is especially proven by Hahnemann, who says:[§] "The following list of the pure symptoms[||] caused by this powerful plant furnishes to the homœopathic physician the means of applying it with advantage in the treatment of certain serious diseases for which no remedy has hitherto been found. He will see, for example, that the juice of the Thuja should cure specifically 'condylomes vénériens,' when not combined (or complicated) with other diseases; and experience proves that it is the only effectual means to employ against this affection."

Thuja was added to the U. S. Ph. at the last revision.[¶]

PART USED AND PREPARATION.—The fresh branchlets, leaves, and flowers are chopped and pounded to a pulp and weighed. Then two-thirds by weight of alcohol are taken, the pulp thoroughly mixed with it, and the whole strained through a piece of new linen, and allowed to stand eight days, in a well-stoppered bottle, in a dark, cool place. The tincture, separated from this mixture by filtration, has a deep orange-brown color by transmitted light, an odor of the bruised leaves, a bitter and astringent taste, and an acid reaction.

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[*] Dr. Torrey, in his *Flora of the State of New York*, says, "Seeds 2 (or by abortion 1) under each scale." Prof. Asa Gray says, in his *Lessons in Botany*, 1874, . . . "each bearing 2 erect ovules." I examined, upon this point, from twenty to thirty cones, taken separately and carefully from different branchlets on each of a dozen or more trees, to corroborate the statement made as above. All cones examined answered the description I have given.

[†] *Medical Flora*, vol. 2, p. 268.

[‡] *Polypodium vulgare*, the common polypody or female fern. Dr. John King, in his *American Dispensatory*, makes this read *Podophyllum*. It matters little.

[§] *Mat. Med. Pura*, article Thuja.

[||] *Loc. cit.*

[¶] That great process, which added *Sapo Viridis*, while it dismissed *Arsenicum*.

CHEMICAL CONSTITUENTS.—*Thujin*, $C_{20} H_{22} O_{12}$. This glucoside occurs in the green parts of the plant. It forms glistening, lemon-yellow, minute crystals, having an astringent taste, and soluble in both water and alcohol.

Thujetin.*—$C_{28} H_{28} O_{16}$. When thujin is heated with a dilute mineral acid, it breaks down into glucose, and this new crystalline body, soluble in alcohol, insoluble in water:

$$\overset{\text{Thujin.}}{(C_{20} H_{22} O_{12})_2} + \overset{\text{Water.}}{(H_2 O)_4} = \overset{\text{Glucose.}}{(C_6 H_{12} O_6)_2} + \overset{\text{Thujetin.}}{(C_{14} H_{14} O_8)_2}.$$

Thujenin, $C_{28} H_{24} O_{14}$. If, however, hydrochloric acid is used and the heating less prolonged, another crystalline body is yielded, having the composition above given, and differing chemically from thujetin by its containing $(H_2 O)_2$ less. Its solubility is the same:

$$\overset{\text{Thujin.}}{(C_{20} H_{22} O_{12})_2} + \overset{\text{Water.}}{(H_2 O)_2} = \overset{\text{Glucose.}}{(C_6 H_{12} O_6)_2} + \overset{\text{Thujetin.}}{(C_{14} H_{12} O_7)_2}.$$

Thujetic acid, $C_{28} H_{22} O_{13}$. When thujin is dissolved in baryta water, it takes up one molecule of water, leaves its glucose in the menstruum, and forms a yellow solution, which, on boiling, deposits orange-yellow crystals of this acid, having the same solubility as the preceding resultants:†

$$\overset{\text{Thujin.}}{(C_{20} H_{22} O_{12})_2} + \overset{\text{Water.}}{H_2 O} = \overset{\text{Glucose.}}{(C_6 H_{12} O_6)_2} + \overset{\text{Thujetic acid.}}{C_{28} H_{22} O_{13}}.$$

Pinipicrin, $C_{22} H_{36} O_{11}$. This glucoside has been extracted from the young leafy branchlets of this tree as well as from the needles of *Pinus sylvestris*. It forms a yellow, bitter, amorphous, hygroscopic powder, soluble in both water and alcohol, and becoming liquid at 100° (212° F.). Like all glucosides, it breaks down under the addition of water, when heated with dilute mineral acids. In this instance, boiling with dilute sulphuric acid converts this body into glucose and *ericinol*:‡

$$\overset{\text{Pinipicrin.}}{C_{22} H_{36} O_{11}} + \overset{\text{Water.}}{(H_2 O)_2} = \overset{\text{Glucose.}}{(C_6 H_{12} O_6)_2} + \overset{\text{Ericinol.}}{C_{10} H_{16} O}.$$

Oil of Thuja.—This colorless or greenish-yellow volatile oil, has a camphoraceous odor and taste, is soluble in alcohol, has a density of 0.925, boils at 190° (374° F.), and for the greater part at 193° to 197° (379.4° to 386.6° F.). It is a mixture of two oxygenized oils. (Wittstein.)

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* *Thujogenin, Thujigenin.*

† Fownes's *Elementary Chemistry*, p. 582.

‡ See under Ericaceæ, 100.

Pino-tannic acid,* $C_7 H_8 O_4$. This acid may be extracted from the green portions of the tree. It results as a brownish-yellow powder, becomes soft and glutinous at 100° (212° F.), and dissolves readily in both water and alcohol. (Wittstein.)

Kawalier† determined, beside the oil, thujin, pino-tannic acid, and pinipicrin, a gelatinous compound, sugar, tannin, and two uninvestigated resins.

PHYSIOLOGICAL ACTION.—"The pathogenesis of Thuja was published by Hahnemann in the fifth volume of the *Reine Arzneimittellehre*.

"The Austrian provings, which are entirely confirmatory of Hahemann's, show that the main action of Thuja is on the genito-urinary organs, with the anus, and on the skin. It causes copious and frequent urination; burning in several parts of the mucous tract; pains of various kinds in the penis; inflammation of the prepuce and glans; ulcers, tubercles, and other excrescences on the sexual organs, with itching and profuse sweating; and, in the female, leucorrhœa. The sexual appetite was depressed, and the catamenia retarded. Burning, itching, swelling, and mucous discharge occurred at the anus; and on the skin generally, but especially in the ano-genital region, tubercles and warts were developed. In the neighboring mucous membranes similar phenomena appeared, but naturally of moister character."‡

The action of the drug in causing great flatulence and distension of the abdomen, with rumbling and colic, leads us back to Boccłerus, who says,§ "*Folia* (*thujæ*) *resolvunt*, *exsiccant*, *flatus pellunt*," etc.; while the excessive chilliness, heat, and profuse sweat, point to a remedy often indicated in intermittent fevers. The peculiar action of this drug is one difficult of explanation.

DESCRIPTION OF PLATE 165.

1. Distant view of tree; Binghamton, N. Y.
2. A winter branch in fruit.
3. A cone.
4. Scale of outer row.
5. Scale of 2d row.
6. Scale of inner row.
7. Centre scales or rhachis.
8. Male catkin (enlarged).
9. Female catkin (enlarged).
10. Inner view of outer scale.
11. Seed (enlarged).

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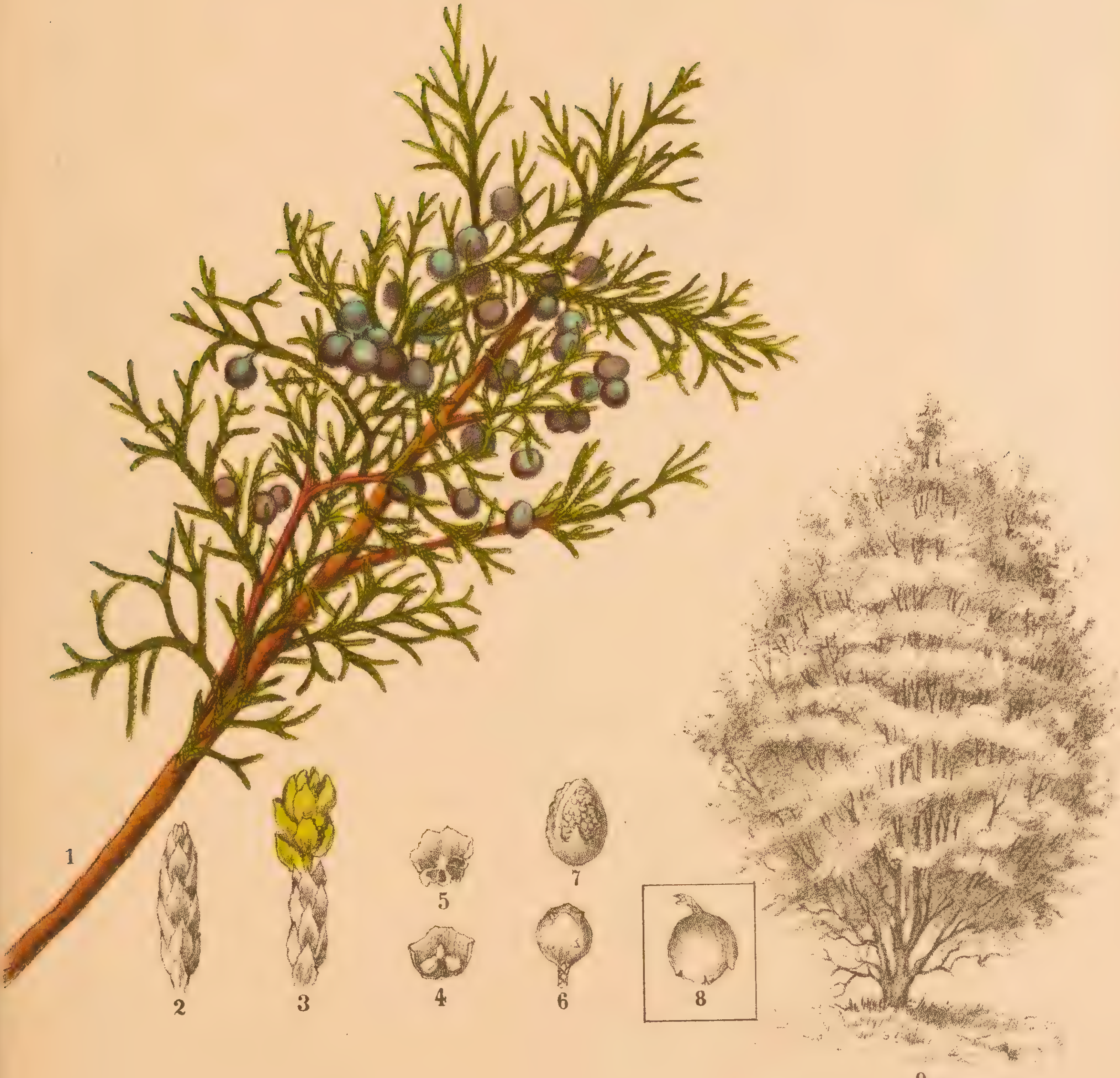
* Pini-tannic acid.

† *Chem. Gaz.*, 1859, pp. 61 and 88.

‡ Hughes, *Pharmacodynamics*, 1876, p. 745.

§ *Cynosura Materiæ Medicæ Pauli Herrmanii*, editio ii, 1747.



C.M. ad nat del. et pinxt.

JUNÍPERUS VIRGINIÀNA, Linn.

Tribe.—CUPRESSINEÆ.

GENUS.—**JUNIPERUS**,* LINN.

SEX. SYST.—DIŒCIA MONADELPHIA.

JUNIPERUS VIRGINIANA.

RED CEDAR.

SYN.—JUNIPERUS VIRGINIANA, LINN.; JUNIPERUS SABINA, HOOK. (NOT LINN.).

COM. NAMES.—RED CEDAR, JUNIPER, OR SAVIN; PENCIL CEDAR; (FR.) CÉDRE DE VIRGINIE; (GER.) VIRGINISCHE CEDER, ROTH CEDER.

A TINCTURE OF THE FRESH TWIGS OF JUNIPERUS VIRGINIANA, LINN.

Description.—This evergreen species often attains a growth of from 60 to 90 feet in the East, though in the West it seldom grows much larger than a full-sized shrub. *Wood* very durable and compact, odorous, and of a reddish color. *Branches* more or less horizontal. *Leaves* small, usually opposite in pairs, not articulated, connate-decurrent upon the stems, awl-shaped, flattish, and scalaceous; upon the young branches acute, flattish, appressed imbricate, and often furnished with a dorsal resin-gland; *midrib* or *nerve* none. *Inflorescence* small catkins terminating lateral branchlets; *flowers* diœcious, or in some cases monœcious. *Fertile catkins* ovoid, scales 3 to 6, scarious, coalescent, each ovuled, and all uniting in fruit to form a berry. *Sterile catkins* formed of 3 to 6 peltate scales; *anther-cells* at the base of the scales. *Fruit* a small, roundish-ovoid, berry-like drupe, erect upon its pedicel-like branchlet and covered with a bluish bloom. *Seeds* 1 to 3, bony, wingless; the lower portion covered with a scarious membrane, smooth; the upper traversed by a smooth ridge, dividing it into two verrucose parts; *cotyledons* two.

History and Habitat.—The Red Cedar is common in sterile, dry soils in nearly all portions of North America, Japan, and the West Indies, flowering in May.

This tree is noted, above all others in this country, for the durability of its wood, no matter how exposed to changes of weather; many of the houses along the Jersey shore of New York Bay, built in the early days of the present century and shingled with cedar, have roofs still in excellent condition, and many posts for the support of outbuildings still stand stanch and firm. The highly-colored and fragrant heart-wood is largely used in the manufacture of lead-pencils, pails, tubs, and various household utensils subjected to wettings. Boxes made of the wood are useful for the preservation of woollens and furs, it being an excellent insectifuge; for this purpose, also, many people scatter the chips in their closets, trunks, etc.

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* Celtic, *Jeneprus*, rough, from the scaly foliage.

Sir W. Hooker considers Juniperus Virginiana identical with the European J. Sabina, the only true point of distinction being in the fruit (Figs. 6 and 8); that of J. Virginiana being erect and somewhat ovate, while that of J. Sabina is pendent or at least pendulous, larger, and more spherical. The leaves of J. Virginiana are much less rich in oil, the yield being nearly eighteen times less from this species than from Sabina.

The leaves of the Cedar are used by the Cree Indians as a diuretic;[*] they also form a good epispastic when made into a cerate; the berries, in decoction, are diaphoretic and emmenagogue; the oil is largely used as an application in arthritic and podagric affections, rheumatic, rheumatoid, traumatic; and the excrescences (cedar apples), often found upon the branchlets, are quite extensively used in domestic practice, in doses of from ten to thirty grains every four hours, as an anthelmintic.

In reference to the Western Juniper, *J. occidentalis*, Mr. J. R. Dodge says:[†] "The fruit of this tree is a large and tuberculated berry, sweet and nutritious, especially when it is first ripe; nevertheless it has a resinous taste, similar to that of all Junipers. It is largely consumed by the Indians of Arizona and New Mexico, who gather great quantities for winter store. When dried and ground into flour, mixed with water, kneaded into a hard mass, and dried in the sun, it has a chaffy look, a brownish-yellow color, is very light, easily digested, and not offensive. . . . . . . Mexicans consume this fruit in large quantities, and it constitutes an article of trade among them."

Juniperus Virginiana is not officinal in the U. S. Ph. In the Eclectic Materia Medica the preparations are: *Oleum Juniperi Virginianeæ* and *Linamentum Olei.*[‡]

PART USED AND PREPARATION.—The fresh young twigs, gathered in May, are dealt with as in the preceding drug. The resulting tincture has a deep reddish-brown color by transmitted light, a strong balsamic odor, a bitterish, astringent and pleasant terebinthic taste, and an acid reaction.

CHEMICAL CONSTITUENTS.—*Cedren*, $C_{15}H_{24}$.[§] This aromatic body, having no camphoraceous odor, a specific gravity of .948, and boiling at 237° (458.6° F.), may be obtained from the liquid portion of the oil that distils over at 264°–268° (507.3°–514.4° F.), by redistillation over metallic potash.

Oil of Cedar.—This aromatic oil is obtained from the wood by distillation, one bushel of chips yielding about a half pint. When extracted, it results as a soft white crystalline mass at 27° (80.6° F.), having a peculiar aromatic odor; when dry it distils almost entirely at 282° (539.6° F.). Cedar oil has a more feeble odor than that of Sabina, and a different polarity.

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[*] Haydon, E. M. Holmes, *Am. Jour. Phar.*, 1884, 619.

[†] *Food-products of the N. A. Indians, U. S. Ag. Rep.*, 1870, 411.

[‡] Oils of Cedar, Cajeput, Cloves, and Sassafras.

[§] Gerhardt (Wittstein).

Cedren-Camphor, $C_{15}H_{26}O$.—This aromatic, almost tasteless body, may be extracted from the oil from which it results as satiny needles, soluble in alcohol, and fusing at 79° (174.2° F.).

A bitter extractive, gum, fatty matter, resin, and tannic acid, have also been separated from the plant.*

PHYSIOLOGICAL ACTION.—Dr. C. A. Lee records a case of a woman who took an ounce of the oil to produce an abortion. Her symptoms were: Rigors; fever; thirst; raving while in fever, exhausted when out; vomiting of black then green matter; griping pain in the bowels; great difficulty in passing urine; uterine hemorrhage, accompanied with labor-like pains; great purging, with stupor without being able to regain consciousness, and death. Many other cases of poisoning by the oil taken in doses of from one drachm to an ounce, for the purpose of abortion or as an emmenagogue, show Juniperus Virginiana to cause severe venous congestion throughout the body. The class of symptoms are in general as follows: Raving or quiet delirium, followed by stupor; pupils dilated; veins of face, head, and neck fully distended; face swollen and livid, or lurid; great thirst, nausea, and vomiting; abdomen swollen, hot, and very painful; great heaving of the chest in effort at inspiration, with stertor and a general appearance of impending apoplexy; slow pulse; and violent convulsions.

DESCRIPTION OF PLATE 166.

1. End of fruiting branch, Ithaca, N. Y.
2. End of fertile branchlet.
3. Sterile flower head.
4. Scale of staminate rachis, showing unopened anthers.
5. Same, with anthers open.
6. Fruit.
7. Seed.
8. Fruit of *Juniperus Sabina.*
9. Distant view of tree.

(2–5 and 7 enlarged.)

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* Jenks, *Am. Jour. Phar.*, xiv., 235.

PLATES 167 TO 178.

SERIES

PHÆNOGAMIA.

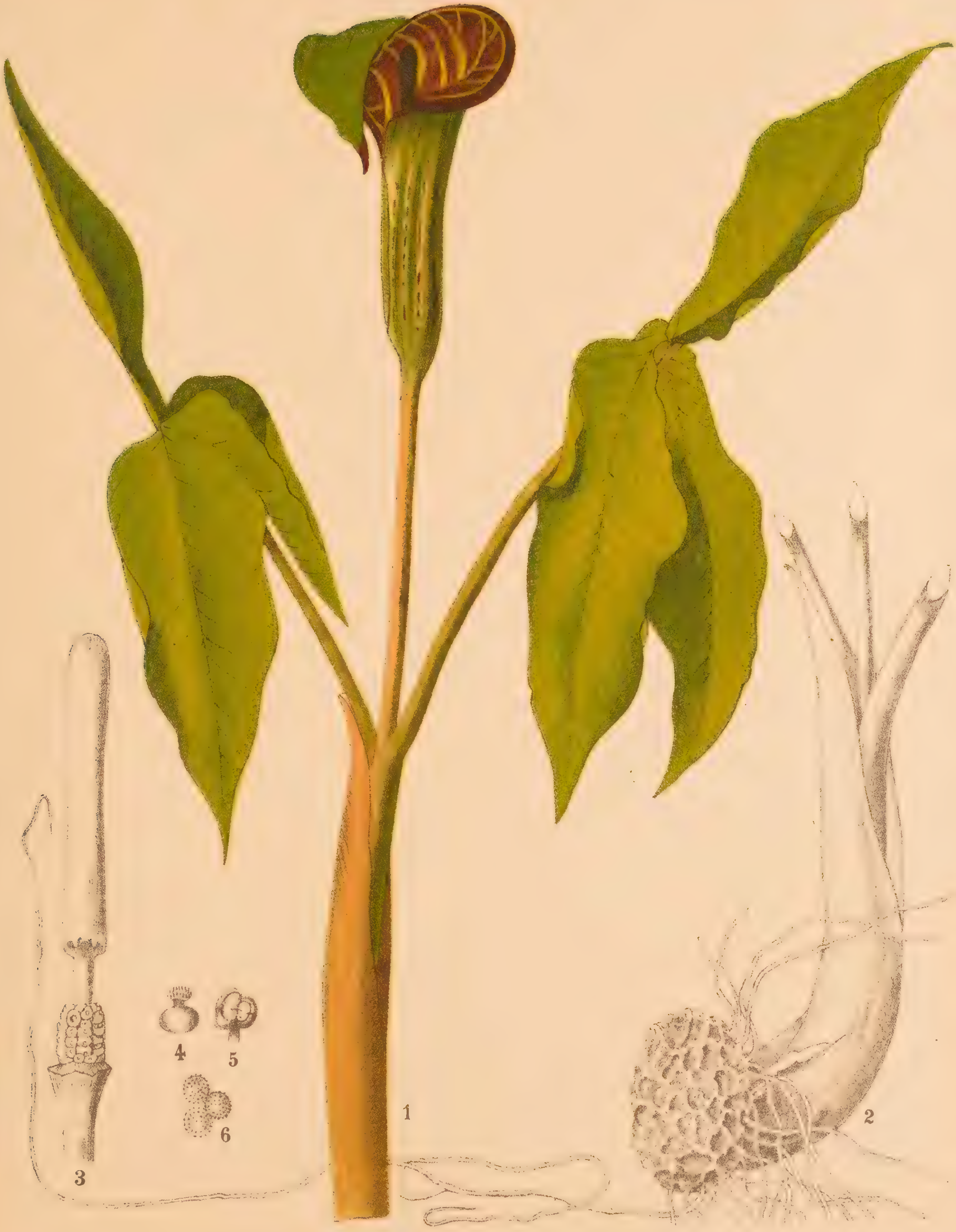
Plants producing true flowers and seeds.

CLASS

MONOCOTYLEDONS.

Plants whose stems exhibit no distinction as to bark, wood and pith; the woody fibre and vessels being in bundles and scattered in the cellular tissue. Leaves generally parallel-veined and entire. Embryo containing a solitary cotyledon.

[To precede plate 167.]



C.F.M. ad nat del. et pinxt.

ARISÆMA TRIPHÝLLUM, Torr.

N. ORD.—ARACEÆ.

GENUS.—**ARISÆMA**,* MART.

SEX. SYST.—MONŒCIA POLYANDRIA.

ARUM TRIPHYLLUM.

INDIAN TURNIP.

SYN.—ARISÆMA TRIPHYLLUM, TORR.; ARUM TRIPHYLLUM, LINN.; ARISÆMA ATRORUBENS, BLUME.

COM. NAMES.—INDIAN TURNIP, JACK-IN-THE-PULPIT, MEMORY-ROOT; (FR.) GOUET À TROIS FEUILLES; (GER.) DREIBLÄTTIGER ARON.

A TINCTURE OF THE FRESH CORM OF ARISÆMA TRIPHYLLUM, TORR.

Description.—This excessively acrid, almost caustic, erect herb, grows to a height of from 8 to 20 inches. *Root* a coarsely reticulated or wrinkled corm, giving off numerous branched rootlets from its juncture with the stalk. *Stalk* composed of the united petioles and scape, sheathed below by a few long membraneous scales. *Leaves* one or two, on long petioles, ternately divided; *leaflets* elliptical-ovate, pointed. *Scape* central, smooth, surmounted by a single spadiceous flower. *Spathe* convoluted below, expanded and forming an incurved arch above, covering the opening of the tube, green externally and brownish-purple within (*A. atrorubens?*); or green without and within (*A. triphyllum?*). *Spadix* elongated, club-shaped, obtuse and naked above, longer than the tube of the spathe, constricted below and bearing the flowers at its insertion in the base of the spathe. *Flowers* monœcious or sometimes androgynous by abortion. (Out of over five hundred specimens, green and purple, examined this spring (1884) only one androgynous spadix was found. In this the sterile flowers were, as usual, above the fertile.) *Sterile flowers* composed of a cluster of closely-appressed anthers; *filament* very short and comparatively thick; *anthers* 2-4 celled, opening at their summits by a pore or chink; *pollen* globular, transparent, the outer coat closely and regularly beset with minute knobs. *Fertile flowers* densely crowded in rows upon the lower portion of the spadix, like corn upon its cob, each flower consisting of a single pistil; *ovary* globular, 1-celled; *style* just apparent; *stigma* capitate, fringed; *ovules* orthotropal, standing erect from the base of the ovary. *Fruit* after the decay of the spathe and extremity of the spadix, composed of few or many 4- to 6-seeded scarlet berries; *embryo* in the centre of the albumen.

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* Ἄρου, *aron*, and σημα, *sema;* marked arum, in allusion to the marked spathe. *Arisarum*, Tourn.

Araceæ.—This order is composed of plants having fleshy corms or rhizomes, or, in the tropics, sometimes woody climbers, an acrid or pungent volatile juice, and monœcious flowers situated upon the same spadix, destitute of floral envelopes, their place being generally filled by a spathe; their fruit is a berry, the seeds of which abound in mealy albumen, or the embryo large and fleshy. The leaves are generally compound, with sheathing petioles, and more or less reticulate veined. The genera are mostly tropical. Besides the genera Arisæma and Symplocarpus, finding representation in this work, the following members of this family are of interest to us: *Caladium seguinum* and *esculentum*, *Dieffenbachia seguina*, one of the most virulent of vegetable poisons, and *Arum dracunculus*, *Italicum*, and *maculatum*.

History and Habitat.—The Indian Turnip grows plentifully about boggy spots in deep, rich woods. It is indigenous to most portions of the United States and Canadas, flowering in May and fruiting in September. The corms, when fresh, especially, and all parts of the plant, have a severely acrid juice, imparting an almost caustic sensation to the mucous membranes, and swelling of the parts when chewed. This action upon the mouths of school-boys, who often play the trick of inviting bites of the corm upon each other, gave rise to the common name, "memory-root," as they never forget its effects. This acridity, however, is dissipated by heat or drying, the roots then becoming very nutrient and palatable, the fecula of the corm forming an excellent "arrow-root." The yield of nutrient matter is said to be about one-fourth the whole substance of the corm. This point is fully appreciated by the Indians of this country, who consider the roots a delicacy, either roasted or boiled. I have roasted them myself, when a boy, and enjoyed a repast very pleasing to an empty stomach. Slices of the fresh root, frequently laid upon the skin, are said to cause vescication.

Arum triphyllum is not officinally recognized in either the U. S. Ph. or Eclectic Materia Medica.

PART USED AND PREPARATION.—The fresh root, gathered before the expansion of the leaves, should be carefully bruised in a covered mortar and weighed. Then two parts by weight of alcohol are taken, the pulp mixed with one-sixth part of it, and the rest of the alcohol added. After stirring the whole well it should be placed in a well-stoppered bottle and allowed to stand at least eight days in a dark, cool place. The tincture, separated by straining and filtering, should have a pale-brownish-yellow color by transmitted light, a slightly sweetish taste, entirely devoid of acrimony, and a neutral reaction to test-paper.

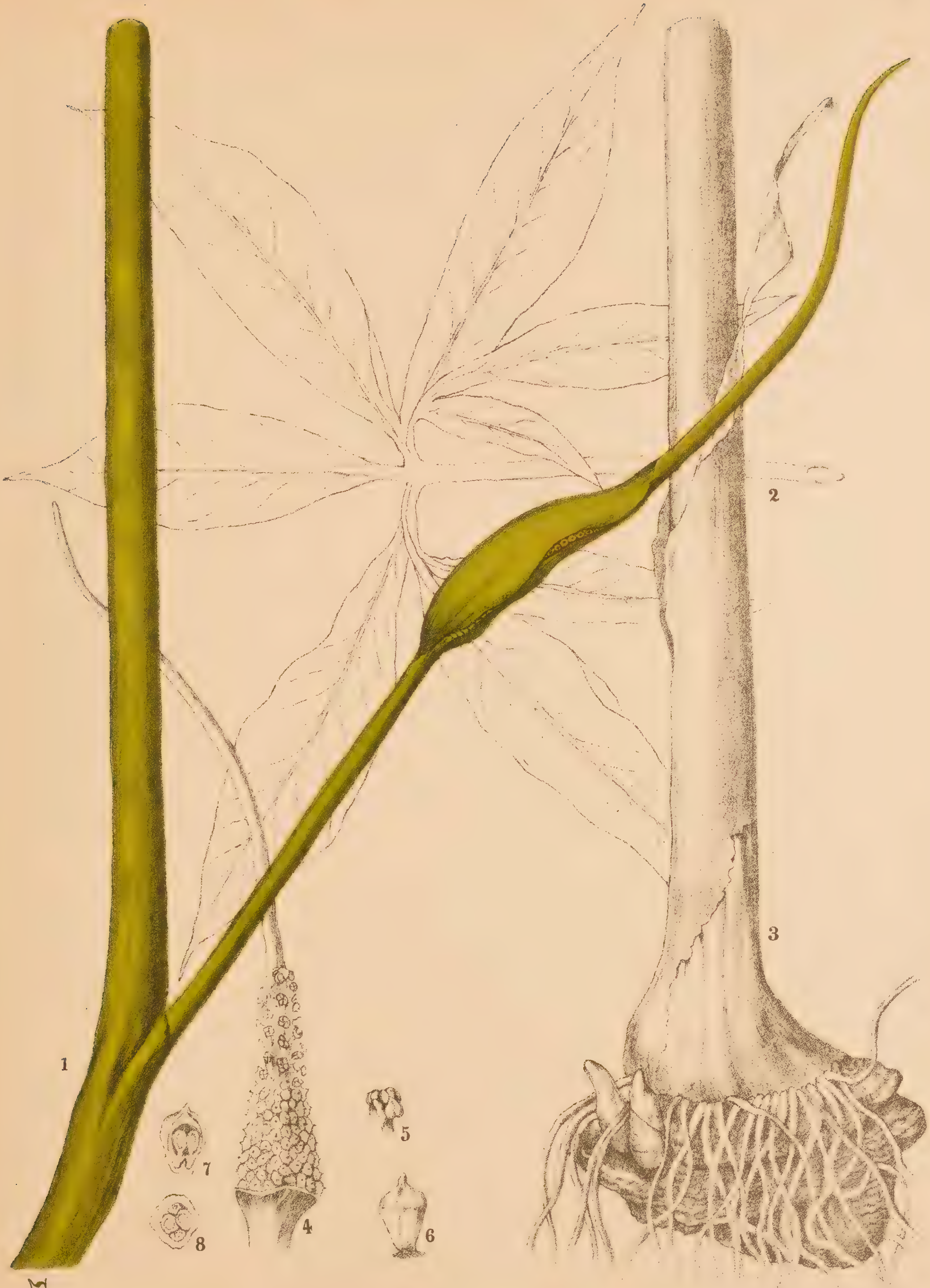
In order to preserve the acrimony of the root, Dr. E. M. Hale recommends rapid trituration in ten parts by weight of coarse sugar-of-milk, and keeping the preparation in hermetically-sealed jars, protected against heat and light. The provings were made with dilutions.

CHEMICAL CONSTITUENTS.—The acrid principle of this plant, as before intimated, is rapidly dispersed by heat. Dr. Bigelow states that this body escapes as an inflammable gas, slightly explosive when mixed with air. The extreme volatility of this body has precluded the determination of its chemical characteristics. No other active body has been determined, though some principle other than the acrid body seems to reside in the corms. Starch, gum, and sugar have been isolated.

PHYSIOLOGICAL ACTION.—From personal observations and the literature upon this plant, its action, when fresh, seems to be quite similar to that of strong liquor ammonia, causing as it does an irritation and burning of mucous membranes and acceleration of secretions. The provings have developed a train of symptoms very characteristic, and therefore useful, but not belonging under this rubric.

DESCRIPTION OF PLATE 167.

1. Young plant, from Binghamton, N. Y., May 27, 1884.
2. Corm.
3. Female spadix.
4. Fertile flower—*i. e.*, pistil (enlarged).
5. Sterile flower—*i. e.*, stamen (enlarged).
6. Pollen x 200.



C.M. ad nat del. et pinxt.

ARISÆMA DRACÓNTIUM, Schott

GENUS.—**ARISÆMA**, MART.

SEX. SYST.—MONŒCIA POLYANDRIA.

ARUM DRACONTIUM.

GREEN DRAGON.

SYN.—ARISÆMA DRACONTIUM, SCHOTT; ARUM DRACONTIUM, LINN.

COM. NAMES.—GREEN DRAGON, DRAGON ROOT; (FR.) GOUET À DRAGON; (GER.) DRACHEN ARON.

A TINCTURE OF THE CORM OF ARISÆMA DRACONTIUM, SCHOTT.

Description.—This peculiar herb usually attains a growth of from 1 to 2 feet. *Corms* clustered, wrinkled, but not so markedly reticulate as in the preceding species; *stems* (if so they may be called) numerous from the same fascicle of corms. *Leaf* usually solitary, pedately compounded of from 7 to 13 oblong-lanceolate, pointed, and entire leaflets. *Inflorescence* in a mostly androgynous but sometimes polygamous spadix that tapers to a long, exserted, and more or less contra-curved point; *spathe* green, scaphoid, open along the inferior surface, and more or less convolute, especially about the apex of the floral portion of the spadix. *Fertile flowers* numerous, inferior, each composed of a single turbinate or quadrangularly compressed pistil; *style* peltate over the summit of the ovary; *stigma* a nipple-like projection at the summit of the style; *ovules* 6 to 8, erect. *Sterile flowers* superior, each composed of a single 4-celled stamen; *filament* short and thick. *Fruit* a globular head of orange-red berries; *rachis* flat; *seeds* 1 to 3 in each berry. Read description of Araceæ, under the preceding plant.

History and Habitat.—The Green Dragon is indigenous to the United States from Florida northward. It grows along the banks of rivers, where it flowers in May and ripens its brilliant fruit in September.

This plant was introduced into English gardens in 1749. It has gained no medical history whatever, its little employment having been in connection with *A. triphyllum* without distinction.

PART USED AND PREPARATION.—The fresh corms, gathered before flowering or after the fruit has fallen, are treated as in the preceding species. The resulting tincture has a slight straw tint by transmitted light, no distinguishing odor, a cold, biting taste, and an acid reaction.

PHYSIOLOGICAL ACTION.—The symptoms caused in the prover, Dr. C. P. Hart,* by doses of from fifteen grains to one drachm of a mixture of one oz. of the expressed juice of the corms with nine ounces of sugar of milk, were quite similar to those caused by *A. tryphillum:* Prickling pains, dryness, then catarrhal secretion from the larynx and bronchial tubes, hoarseness; great prostration; increased heart's action; dyspnœa; rattling of mucus on expiration; muco-purulent expectoration, composed mostly of thick, heavy, yellowish pus; and increased urination.

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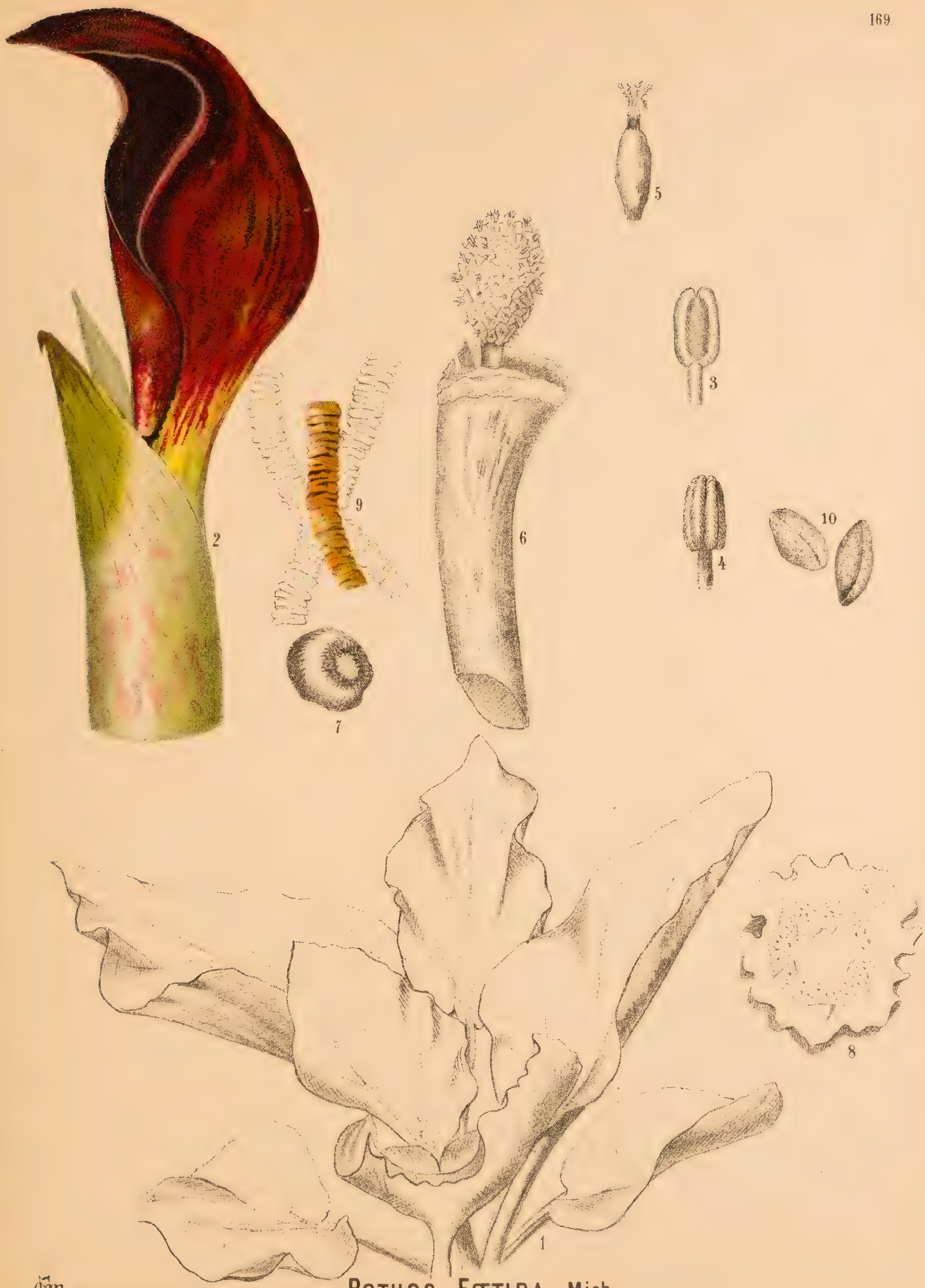
* *Am. Hom. Obs.*, 1875, p. 537.

DESCRIPTION OF PLATE 168.

1, 2, and 3. Whole plant, Pittsburgh, Pa., June 10th, 1875.
2. Leaf (four times reduced).
4. Spadix.
5. Sterile flower.
6. Fertile flower.
7 and 8. Sections of the pistil.
(4–8 enlarged.)



CFM. ad nat. del. et pinxt.

POTHOS FŒTIDA, Mich.

GENUS.—**SYMPLOCARPUS**,[*] SALISB.

SEX. SYST.—TETRANDRIA MONOGYNIA.

POTHOS.[†]

SKUNK CABBAGE.

SYN.—POTHOS FŒTIDA, MICH.; ICTODES FŒTIDUS, BIGEL.; DRACONTIUM FŒTIDUM, L.; SYMPLOCARPUS FŒTIDA, SALISB.; (?) ARUM AMERICANUM, CATESBY.

COM. NAMES.—SKUNK CABBAGE, SKUNK WEED, POLECAT WEED, MEADOW CABBAGE, FŒTID HELLEBORE, (FR.) POTHOS FETIDE, (GER.) STINKENDE DRACHENWURZEL.

TINCTURE OF THE FRESH ROOT OF DRACONTIUM FŒTIDUM,[‡] L.

Description.—A low-spreading ill-favored weed; growing profusely in swamps and on bottom lands. *Root* perennial, from 3 to 5 inches long, and about 2 inches thick, of a reddish-brown color externally, terminating abruptly where it gives off numerous crowded rootlets, which penetrate the boggy earth, its habitat, to a depth of from 6 inches to 2 feet or more. *Stem* none. *Leaves* numerous, not appearing until the ovules are fertilized; they are large, ovate, entire, smooth, longitudinally furrowed by the thick pale ribs, cordate at the base, with an acute tip, and spring from the root on long petioles, deeply grooved on their upper aspect, and sheathed at their lower juncture. The flowers are inclosed by the *spathe*, a fleshy, ovate, shell-form, swelling body, generally about 4 inches long, by from 2 to 3 inches in the greatest diameter; this hood has an auriculate base, an acute tip and infolding edges, which are at length coalescent. The *spadix*, fully sheltered in the basal cup of the spathe, is ovoid-globose, about 1 inch long by one-half to three-quarters of an inch in diameter, situated upon a short peduncle, and completely invested by the perfect tetrandrous, purplish flowers. *Calyx* composed of four fleshy, wedge-shaped sepals, whose inflected tips and edges match so perfectly those of the neighboring flowers as to completely cover the spadix, making a solid body of perianths. *Stamens* four, situated opposite the sepals, which, with their subulate filaments, they fully equal in length. *Anthers* oblong, extrorse, with two parallel cells. *Pollen* grains quite small considering the size of the plant, and greatly resembling, under the microscope, pointed grains of wheat. *Ovary* one-celled, with a single suspended anatropous ovule. *Style* four-angled, pyramidal. *Stigma* minute, pubescent. *Fruit* compound, consisting of the enlarged fleshy spadix together with the perianths, making in all a spongy, soft, glutinous, uncanny, ill-smelling mass, inclosing near the surface the ovoid, bullet-like *seeds;* destitute of albumen, but containing a large, fleshy, globular *embryo*, several *plumules* and a *radicle*. A general description of the class and order will be found under Arum triphyllum.

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[*] From συμπλοκή, connection, and καρπός, fruit, alluding to the coalescence of the ovaries into a compound fruit.

[†] The name under which the plant was proven, see first synonym.

[‡] Using the name as applied by the "Am. Hom. Phar.," see third synonym.

History and Habitat.—This is our only species of the genus; still it is regarded by the laity as one too many, on account of its very offensive and penetrating odor, which, though individualizing this plant, is still not peculiar to it alone, as the fruit of some of our wild currants, especially Ribes rigens, when crushed, emit a scent very similar to it.

In earliest spring, by carefully examining boggy grounds, one may notice the points of many spathes just appearing above the soil, from which they soon arise and mature before the leaves expand. The fruit ripens in September, usually after the leaves have all decayed. The rapidity with which this plant matures is so great that in some seasons a second appearance of the spathes is made in November.

This is one of the plants often wrongly classified, being a kind of broken link in the chain of Araceæ. The genera Pothos; Arum; Dracontium; Symplocarpus (without affinity) and Orontium, to which it has been successively assigned, will not admit it; we, therefore, must agree with Dr. Bigelow's observations and accept his expressive name, Ictodes fœtidus.[*] Concerning the cross-fertilization of this plant I have noted the following: the pollen when mature falls from the anthers in such large quantities that the cup-like base of the spathe is covered to a depth of a line or more; wallowing about in this fertilizing element may be found numerous carrion beetles attracted hither by the odor of the plant, which undoubtedly misleads them in their search for food. In this way, through their wanderings to and fro, fertilization is produced by their apparently aimless crawling about over the spadix and base of the spathe. They are prevented from spending valuable time upon the inner walls of the spathe, by its varnished smoothness and perplexing curves, which keep them up to their work. Those that visit the interior of a spathe before the pollen is discharged, are compelled to remain until the anthers are ripe, for it is not until then that the trap-like formation opens sufficiently at the base to permit easy exit. Much pollen is lost by being devoured by the numerous slugs that crawl into the spathe.

The skunk cabbage is not officinal in the U. S. Ph., having been dismissed. In the Eclectic Materia Medica the use of this drug, especially compounded with others, is considerable.

Tinctura Symplocarpi, Pulvis Lobeliæ Compositus, Pulvis Asclepiæ Compositus, Tinctura Lobeliæ Composita, Tinctura Lobeliæ et Capsici, Tinctura Sanguinariæ Compositus and Acetata, Tinctura Viburnii Composita.

The fresh or dried fleshy fruits, divested of the seeds, and mashed with an equal portion of Indian meal, have been used in this neighborhood (Central New York) to great extent, and with excellent success, as a poultice for caking mammæ, promptly, in many instances coming under my notice, dissipating the hardness and restoring the glands to health.

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[*] ἴχτιζ, *viverra*, οζω, *oleo*, Skunk oil.

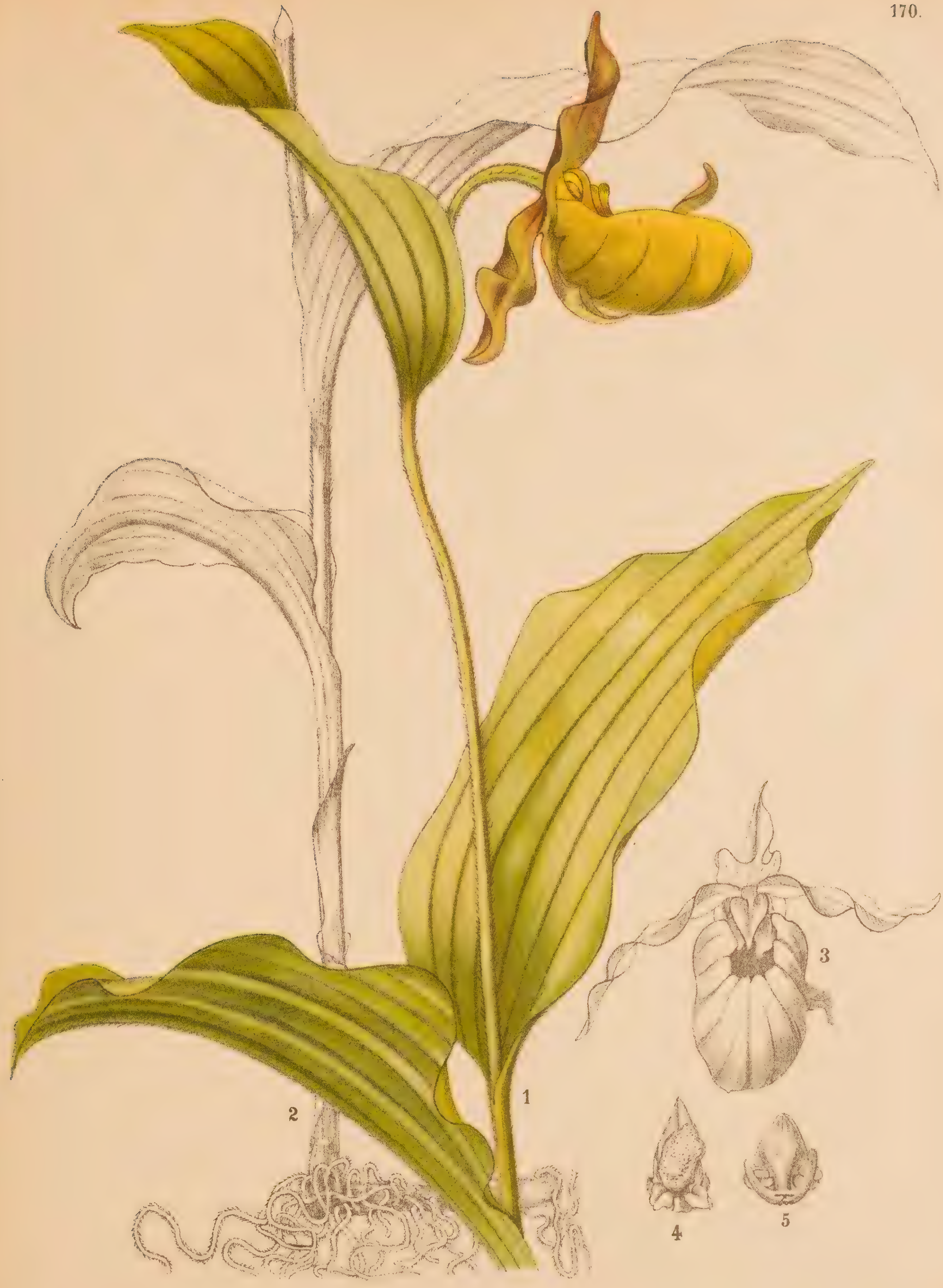
PART USED AND PREPARATION.—The fresh root and rootlets gathered in the spring are chopped and pounded to a pulp and weighed. Then two parts by weight of alcohol are taken, and after thoroughly mixing the pulp with one-sixth part of it, the rest of the alcohol is added. After having stirred the whole, pour into a well-stoppered bottle and let it stand eight days in a dark, cool place. The tincture is then separated by decanting, straining, and filtering. Thus prepared it is of a light brown color by transmitted light, a slightly acrid taste, and neutral to litmus papers.

CHEMICAL CONSTITUENTS.—The properties of this plant have not as yet been determined by analysis, but may doubtless be referred to a principle volatile in its nature, as drying for any length of time dissipates both the odor and acridity, and heat applied rapidly removes all its active properties. An analysis reported by Mr. J. M. Turner in "American Journal of Pharmacy," vol. 2, p. 1, seems to prove the above to be the case. He, however, obtained from his assay a *volatile fatty body*, a small amount of *volatile oil*, *resin*, *fixed oil*, *wax*, *starch*, *sugar* and *gum*.

PHYSIOLOGICAL ACTION.—The root when chewed produces irritation of the mouth and fauces, acting also as a stimulant to the secretory glands of the mucous membrane. Taken into the stomach it causes vertigo, nausea, sometimes vomiting and temporary blindness. Its volatile properties probably suggested to palliative practice its use in hysteria and spasmodic asthma, though the provings do not show it curative yet in those disorders.

DESCRIPTION OF PLATE 169.

1. Whole plant four times reduced.
2. Spathe; Bergen, Jersey City, N. J., March 1st, 1880.
3. Stamen (enlarged), inner view.
4. Ditto, outer view.
5. Pistil (enlarged).
6. Spadix.
7. Seed.
8. Section of Rootstock.
9. Roots.
10. Pollen grains x 380.



C.F.M. ad nat. del. et pinxt.

CYPRIPÈDIUM PUBÉSCENS, Willd.

GENUS.—**CYPRIPEDIUM**,* LINN.

SEX. SYST.—GYNANDRIA DIANDRIA.

CYPRIPEDIUM PUBESCENS.

YELLOW LADY'S SLIPPER.

SYN.—CYPRIPEDIUM PUBESCENS, WILLD.; CYPRIPEDIUM LUTEUM, AIT. (?)

COM. NAMES.—LARGER YELLOW LADY'S SLIPPER, MOCCASIN FLOWER, AMERICAN VALERIAN, YELLOWS, NOAH'S ARK, YELLOW UMBIL, NERVE-ROOT; (FR.) SABOT DE VENUS JAUNE, CYPERIPEDE JAUNE; (GER.) GELBFRAUENSCHUH.

A TINCTURE OF THE FRESH ROOT OF CYPRIPEDIUM PUBESCENS, WILLD.

Description.—This beautiful, pubescent herb, grows to a height of from 1 to 2 feet. *Root* horizontal, cylindrical, thickly beset with fibrous rootlets. *Stem* simple, erect, leafy to the top. *Leaves* large, ovate, or ovate-lanceolate, pointed, prominently many-nerved, plicate, and sheathing at the base. *Inflorescence* terminal; *flowers* single or in pairs, scentless. *Sepals* 3, two of which are united under the lip, elongated lanceolate, brownish or purplish, pointed, and spreading. *Petals* lanceolate, undulate and twisted, brownish or purplish, pointed, narrower than the sepals; *sac*, *lip*, or *labellum* roundish, shorter than the sepals and petals, much inflated above, horizontal, laterally compressed, convex, pale yellow. *Column* short, declined; *stamens* 3, the two fertile ones situated each side of the column. The body that answers to the stamen in other orchids is but rudimentary in this genus; and situated on the upper side of the column, covering the whole style. It is dilated-triangular or heart-shaped and pointed; *filaments* short; *anthers* 2-celled, opening by the face of the cells becoming filmy and glutinous, causing it to be ruptured when touched; *pollen* mealy-pulverent, adhering to the detached portions of the cell-face. *Style* a broad, terminal, obscurely 3-lobed, roughish, moist disk.

Orchidaceæ.—This vast order of striking and strangely beautiful plants is characterized as follows: *Herbs* of varied aspect, often epiphytes. *Roots* often tuberous or tuber-bearing. *Leaves* alternate, parallel veined. *Flowers* irregular, each subtended by a bract, and assuming such varied forms as to often resemble birds, insects, etc.: *perianth* of 6 parts (*calyx* 3, *corolla* 3); one of the petals, the upper one, is termed the *labellum* or *saccate lip;* this, by the twisting of the ovary or axis, becomes generally anterior. A *column*, composed of the united filament and style, renders the essential organs gynandrous. *Stamen* single (Ex. Cypripedium), fertile; *filament* combined in the column; *anther* 2-celled, sometimes deciduous; *dehiscence* sometimes opercular, sometimes accomplished by a disintegration of the face of the cell; *pollinia* composed of one or two masses of pollen-grains in each anther-cell; *pollen* waxy or mealy-pulverent. *Ovary* inferior, 1-celled, 6-ribbed, sometimes twisted; *placentæ* 3, parietal; *style* forming a part of the column; *stigma* a viscid, concave disk in front of the column. *Seeds* minute, innumerable; *testa* reticulate.

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* Κύπρις, *Kypris*, Venus; πόδιον, *podion*, a sock or buskin; Venus's slipper.

It would seem an almost essential feature of Orchidaceæ that some part or organ of each plant should be twisted.

Our materia medica contains but one drug from the family, besides the one under consideration, viz., the European lady's tresses (*Spiranthes autumnalis*, Rich.).

Two other members are well known—vanilla (*Vanilla planifolia*, *Andrews*), and the mucilaginous nutritive Salep, a preparation of the tubers of several species of the genera *Orchis* and *Eulophia*. A few other species are sometimes referred to in medicine—a West Indian stomachic (*Bletia verecunda*, *R. Br.*), a Guinean purgative and Tortolan anthelmintic (*Epidendrum bifidum*, *Aubl.*), an Indian vermifuge and diuretic (*Epidendrum auriculatum*), a reputed American remedy for scrofula (*Goodyera pubescens*, *R. Br.*), and a masticatory in toothache (*Arethusa bulbosa*, *Linn.*). There are also three genera whose tubers yield an excellent glue: the South American *Catasetum* and *Cyrtopodium*, and our *Aplectrum*. Rafinesque says:* "The orchidaceous plants which have long roots, like the cypripedium, appear to have different properties from those which have round or oval tubercles."

History and Habitat.—The Larger Yellow Lady's Slipper is indigenous to the lower parts of Canada, and the northern and western United States, growing in bogs and wet, shady woods, where it blossoms from May until June. This plant was introduced into medical literature by Rafinesque, who says:† "Of this beautiful genus, all the species are equally medical; they have been long known to the Indians. . . . The most efficient is the C. luteum. . . . They are sedative, nervine, antispasmodic, etc., and the best American substitute for valerian in almost all cases. They produce beneficial effects in all nervous diseases and hysterical affections, by allaying pain, quieting the nerves and promoting sleep. They are also used in hemicrania, epilepsy, tremors, nervous fever, etc., . . . having no baneful nor narcotic effects. The dose is a teaspoonful of the powder, diluted in sugar-water, or any other convenient form." The above uses of the powdered root have been corroborated fully in domestic practice.

Cypripedium is officinal in the U. S. Ph. as *Extractum Cypripedii Fluidum*, from both Cypripedium pubescens, Willd., and C. parviflorum, Salisb. The preparations in the Eclectic Materia Medica are: *Extractum Cypripedii Alchoholicum*, *Extractum Cypripedii Fluidum*, and *Tinctura Serpentariæ Composita*.‡

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* *Med. Flora*, vol. i, p. 145.

† Ibid., pp. 143–4.

‡ Aristolochia, Ipecacuanha, Crocus, Camphora, and Cypripedium or Opium.

PART USED AND PREPARATION.—The fresh root, gathered in early spring, or in autumn, is chopped and pounded to a fine pulp and weighed. Then two parts by weight of alcohol are taken, the pulp mixed with one-sixth part of it, and the rest of the alcohol added. After a thorough mixture is made, pour it into a well-stoppered bottle, and let it stand eight days in a dark, cool place.

The tincture, separated from this mass by filtration, should have a beautiful crimson color by transmitted light, a nauseous fecal odor, a taste somewhat similar to that of the black walnut, and an acid reaction.

CHEMICAL CONSTITUENTS.—An analysis of the root by H. C. Blair[*] resulted in the separation of a volatile oil and acid, tannic and gallic acids, two resins, and the usual plant constituents.

Cypripedin.[†] The body sold under this name is simply a mixed mass of all the constituents of the root not soluble in water.

PHYSIOLOGICAL ACTION.—Cypripedium acts as a sedative to the nerves in general, causing a sense of mental quiet and lassitude, and subduing nervous and mental irritation. It seems also to quiet spasms of voluntary muscles, and hysterical attacks, especially in women. This is one of our drugs that has not been sufficiently thought of by provers. It merits a full proving, and would, without doubt, prove more useful if the preparation be made of the whole plant, thus bringing in its action upon the skin, which as yet seems to be little known.[‡]

Description of Plate 170.

1. Upper part of plant in flower, Binghamton, N. Y., June 2d, 1884.
2. Lower portion and root.
3. Bird's-eye view of flower (somewhat reduced), showing the third or abortive stamen.
4. Column (enlarged), inner view.
5. Column, outer view, after removal of the abortive stamen.

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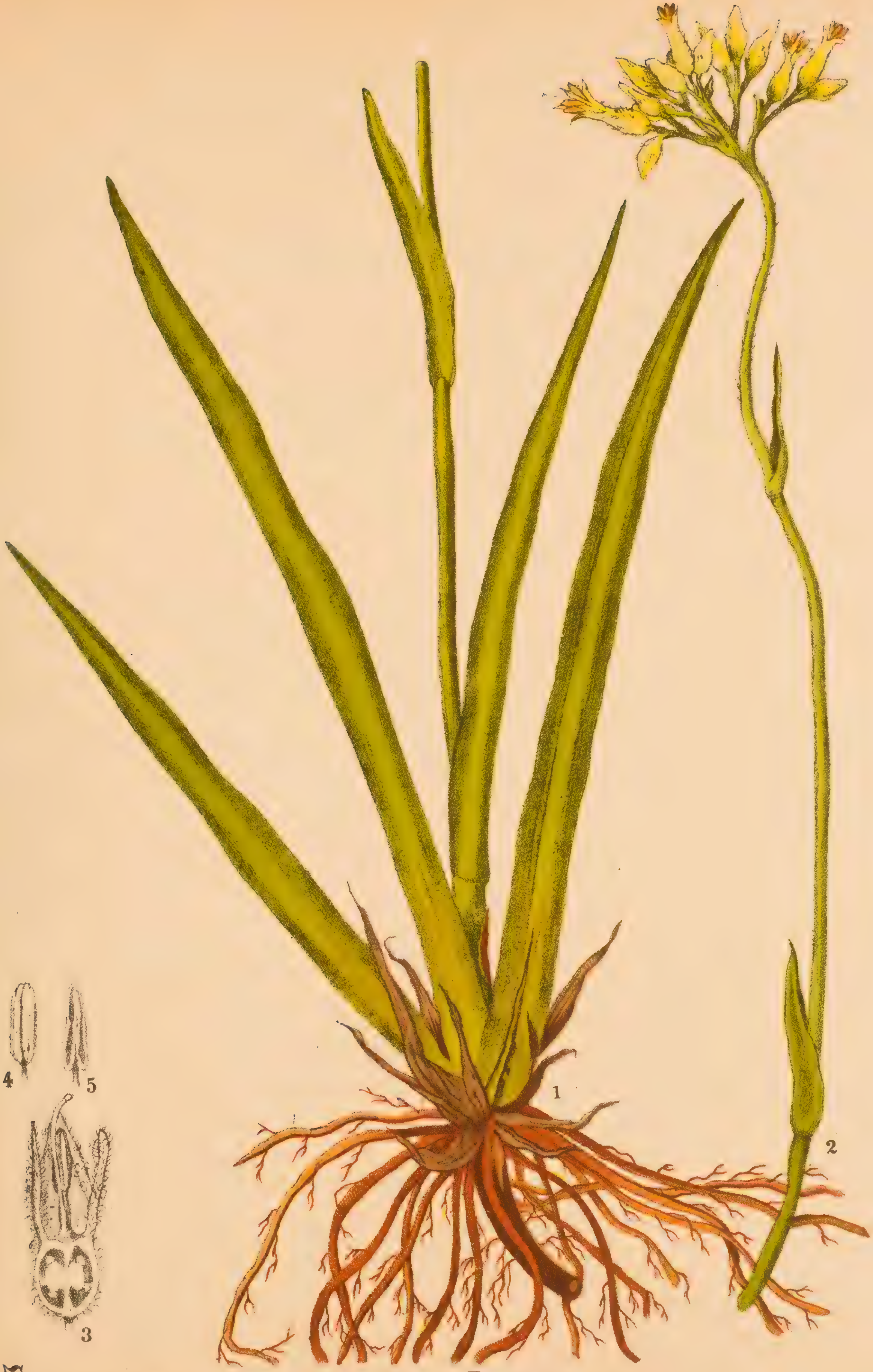
[*] *Am. Jour. Phar.*, 1866, p. 494.

[†] *Oleoresina Cypripedii.*

[‡] See Hale's "New Remedies," art. Cypripedium.



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LACHNÁNTHES TINCTORIA, Ell.

N. ORD.—HÆMODORACEÆ.

GENUS.—LACHNANTHES,* LINN.

SEX. SYST.—TRIANDRIA MONOGYNIA.

LACHNANTHES.

RED ROOT.

SYN.—LACHNANTHES TINCTORIA, ELL.; HERITIERA GMELINI, MICHX.; DILATRIS TINCTORIA, PURSH.; D. HERITIERA, PERS.

COM. NAMES.—RED ROOT, SPIRIT WEED, DYERS' DILATRIS.

A TINCTURE OF THE WHOLE PLANT LACHNANTHES TINCTORIA, ELL.

Description.—This perennial herb grows to a height of from 1 to 2 feet. *Rhizome* more or less horizontal, cylindrical, ligneous; *rootlets* fibrous, deep orange-red, mostly springing from the head of the rootstock. *Stem* erect, simple, hairy above the last leaf. *Leaves* equitant, sword-shaped, mostly clustered at the base of the stem, those evident on the stem remote, small, and sheathing at the base. *Inflorescence* a dense, terminal, compound, leafy-bracted cyme; *flowers* dingy yellow; *perianth* woolly externally, 6-parted, the three inner divisions larger, the outer three linear. *Stamens* 3, opposite the larger lobes; *filaments* dilated below; *anthers* exserted, linear, versatile, 2-celled, opening longitudinally. *Ovary* globular, 3-celled, wholly adherent to the calyx-tube; *ovules* amphitropous; *style* filiform, exserted, declined, deciduous; *stigma* evident, capitate. *Fruit* a globular, 3-angled capsule; *placentæ* fleshy; *seeds* few in each cell, discoid, concave, fixed by the middle.

Hæmodoraceæ.—This small family of herbaceous plants belongs chiefly to South Africa and Australia, only 3 genera and 4 species being found in the United States. The order is characterized as follows: *Roots* fibrous, spreading; *stem* scape-like, leafy; *leaves* mostly equitant, sword-shaped. *Flowers* regular and perfect, 3 to 6 androus; *perianth* tubular, woolly, or mealy outside, 6-lobed, and coherent with a portion or all of the ovary; *sepals* and *petals* undistinguishable. *Stamens* inserted upon the tube of the perianth; *anthers* introrse. *Ovary* 3-celled; *ovules* anatropous or amphitropous, and attached to central placentæ; *style* single and deciduous or 3-partible and persistent; *stigma* single, or, when 3, then alternate with the cells of the ovary. *Fruit* a 3-celled, loculicidal capsule, crowned by or enclosed within the persistent perianth; *seeds* 3–many; *embryo* small; *albumen* hard or fleshy, surrounding the embryo.

The only proven plants of this order are those treated of in this work. The roots of several south-tropical species are tonic, bitter, and astringent, while several

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* Λάχνη, *lachne*, wool; ἄνθος, *anthos*, flower: from the resemblance.

Australian species have roots that, though acrid when in a recent state, form a nutritious food for the natives when roasted.

History and Habitat.—Lachnanthes is indigenous to the United States, growing in sandy swamps from Florida to New Jersey and Rhode Island along the coast, where it blossoms from June to September, according to locality. It was introduced into England as a green-house perennial in 1812, and then propagated from seed.

The root was esteemed as an invigorating tonic by the Aborigines, especially the Seminoles, in whom it is said to cause brilliancy and fearless expression of the eye and countenance, a boldness and fluency of speech, and other symptoms of heroic bearing, with, of course, the natural opposite after-effects. A tincture of the root has been recommended in typhus and typhoid fevers, pneumonia, various severe forms of brain disease, rheumatic wry-neck, and laryngeal cough.

PART USED AND PREPARATION.—The whole fresh plant, while flowering, is chopped and pounded to a pulp and weighed. Then two parts by weight of alcohol are taken, the pulp mixed with one-sixth part of it, and the rest of the alcohol added. After thorough stirring the whole is poured into a well-stoppered bottle, and allowed to macerate for eight days in a dark, cool place.

The tincture, separated from this mass by pressure and filtration, has a brilliant carmine color by transmitted light; no distinguishing odor; a slightly bitter and ligneous taste; and an acid reaction.

CHEMICAL CONSTITUENTS.—The roots yield a fine red dye and a bitter resin, but no analysis has yet been made of the plant that determines the nature of its specific constituents.

PHYSIOLOGICAL ACTION.—Lachnanthes, in doses varying from a few drops to a drachm of the tincture, causes: Mental exhilaration followed by ill-humor; vertigo and headache; brightness of the eye with dilation of the pupil followed by dullness, pressive pains, and impaired vision; tearing in the ears; hectic redness of the cheeks; dryness of the throat; rumbling of flatus in the abdomen; fullness and heat in the chest; increased heart's action; pain and stiffness of the neck and shoulders;* restlessness; sleeplessness; and coldness and fever followed by sticky sweat. The action of this drug appears, as far as proven, to be quite similar to that of Pulsatilla.

Description of Plate 171.

1 and 2. Whole plant, Landisville, N. J., July 18th, 1885.
3. Section of flower.
4 and 5. Anther.
(3–5 enlarged.)

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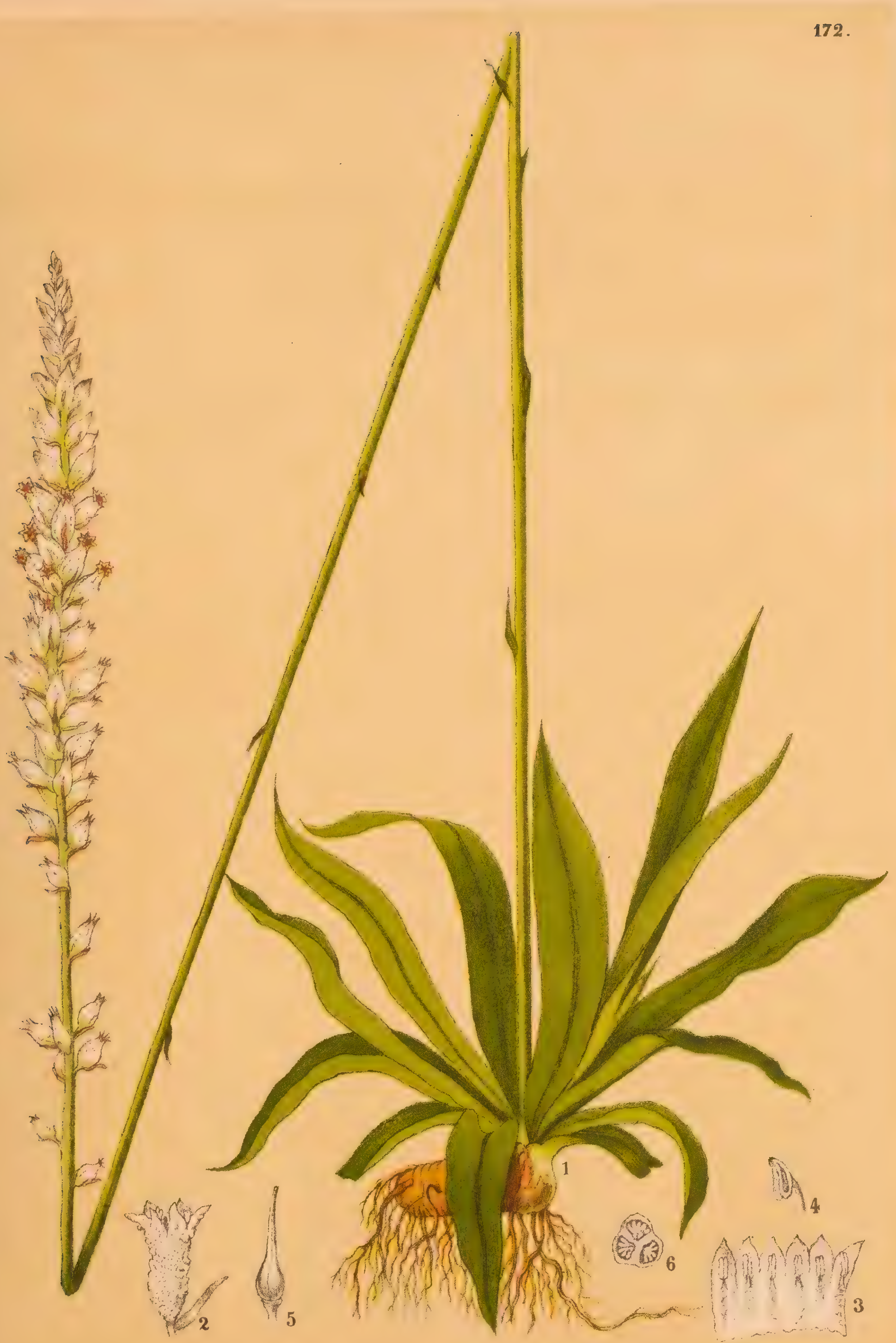
* I have found Lachnanthes an excellent remedy for rheumatic stiffness of the neck and shoulders, with inability tto turn the head without severe pain, especially where the trouble seemed to be first a neuralgia of the fifth nerve then ransferred to the neck and shoulder.



C.M. ad nat del. et pinxt.

ÁLETRIS FARINÒSA, Linn.

N. ORD.—HÆMODORACEÆ. 172

GENUS.—**ALETRIS**,[*] LINN.

SEX. SYST.—HEXANDRIA MONOGYNIA.

ALETRIS.

STAR WORT.

SYN.—ALETRIS FARINOSA, LINN.; A. ALBA, MICH.

COM. NAMES.—STAR WORT, STAR ROOT, AGUE ROOT, AGUE GRASS, ALOE ROOT, BITTER GRASS, BLACK ROOT, BETTIE GRASS, COLE ROOT, CROW CORN, FALSE UNICORN ROOT, UNICORN ROOT,[†] DEVIL'S BIT,[‡] COLIC ROOT,[§] STAR GRASS,[||] BLAZING STAR;[¶] (FR.) ALÉTRIS FARINEUX; (GER.) MEHLIGE ALETRIS.

A TINCTURE OF THE FRESH ROOT OF ALETRIS FARINOSA, LINN.

Description.—This prostrate, perennial, spreading herb is characterized as follows: *Root* cylindrical-tuberous, more or less horizontal, giving off numerous fibres from its lower surface. *Stem* none; *leaves* stellate-rosulate, all smooth, flat, thin, coriaceous, pale, sessile and lanceolate acute. *Inflorescence* in a wand-like, crowded raceme terminating a long, nearly naked, terete and rigid scape, that arises from the axis of the leaf-cluster; *flowers* nearly sessile, creamy white; *perianth* tubular-cylindrical, somewhat campanulate, persistent, and cohering below with the base of the ovary; *limb* 6-cleft; *lobes* lanceolate-triangular, somewhat spreading. *Stamens* 6, equal; *filaments* short, inserted at the base of the lobes of the perianth; *anthers* included, sagittate, introrse. *Ovary* globular, 2-celled; *ovules* anatropous; *style* subulate, 3-cleft at the apex; *stigmas* small, minutely 2-lobed. *Fruit* an ovate-tapering, coriaceous capsule, enclosed in the persistent floral envelope; *dehiscence* loculicidal; *carpels* 3. *Seeds* numerous, ovate, ribbed; *embryo* minute, roundish, situated near the hilum; *albumen* fleshy and oily.

History and Habitat.—Aletris is indigenous to North America, where it frequents the borders of wet, sandy or swampy woods from Florida northward, especially at the seaboard.

This plant furnishes one of the many examples of the uncertainty attending the use of vulgarisms in reference to plants, no less than half its common names being also used to designate another plant, our Helonias (*Chamælirium luteum*), which it no more resembles than a cucumber does a pumpkin, except mayhap in the root when separate from the rest of the plant; the root of Helonias, however, always shows, on section, holes in its cortex, through which the fibrous rootlets pass (see figure, Plate 177); this is not so in Aletris root, and will always serve as a distinguishing point between them.

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[*] 'Αλετρίς, *Aletris*, a female slave, who grinds corn; from the mealy appearance of the perianth.

[†] The Unicorn is *Martynia proboscidea*, Glox. (Bignoniaceæ).

[‡] The name usually designates *Chamælirium luteum*, Gray (Liliaceæ).

[§] More properly a vulgarism of *Dioscorea villosa*, Linn. (Dioscoreaceæ).

[||] This name should only indicate *Hypoxys erecta*, Linn. (Amyrillidaceæ).

[¶] The true Blazing Star is *Liatris squarrosa*, Willd. (Compositæ).

Aletris was held in high repute by the Aborigines as a stomachic, bitter tonic, and emmenagogue; from them it passed into the hands of the laity and herbalists. Probably the first printed notice of the plant appeared, unnamed, in 1730.* It was introduced into England in 1768, but received little attention except for its extreme bitterness. Pursh speaks of the benefits obtained from this drug in colic; Dr. Cullen recommends it in rheumatism, and Dr. Thacher in anasarca. Dr. Bigelow judges that it probably will prove a tonic bitter of value, remarking at the same time that he knows of no plant which surpasses it in genuine, intense, and permanent bitterness. Rafinesque claims that it relieves flatulent and hysteric colic, speedily avails in fevers, is too powerful for bitters, and in large doses is narcotic. The first notice given of its action upon the female organs of reproduction is in Eclectic practice, where it receives consideration in chlorosis, dysmenorrhœa, engorged uteri, amenorrhœa, and prolapsus.

The officinal preparation in the Eclectic Materia Medica is *Extractum Aletridis Alcoholicum.*

PART USED AND PREPARATION.—The fresh root is chopped and pounded to a pulp, and treated as in the preceding drug. The resulting tincture has a clear orange color by transmitted light, no characteristic odor, a very bitter taste, and an acid reaction.

CHEMICAL CONSTITUENTS.—No analysis has yet been made to determine the properties of the bitter principle of this species, which, however, proves more soluble in alcohol than in water. The Tilden's analysis† determines a large proportion of a bitter extractive, resin, and coloring-matter, besides the usual constituents of plants.

PHYSIOLOGICAL ACTION.—Aletris proves, when used in the fresh state, emetic, cathartic, and somewhat narcotic; this mostly disappears on drying. In smaller doses it produces vertigo, stupefaction, colic in the hypogastrium, and heaviness in the uterine region. The drug deserves a very thorough proving, as, from clinical results, it seems especially adapted to many forms of uterine trouble that appeal to our utmost care.

DESCRIPTION OF PLATE 172.

1. Whole plant, Landisville, N. J., July 3d, 1885.
2. Flower.
3. Perianth, opened.
4. Stamen.
5. Pistil.
6. Horizontal section of ovary.

(2–6 enlarged.)

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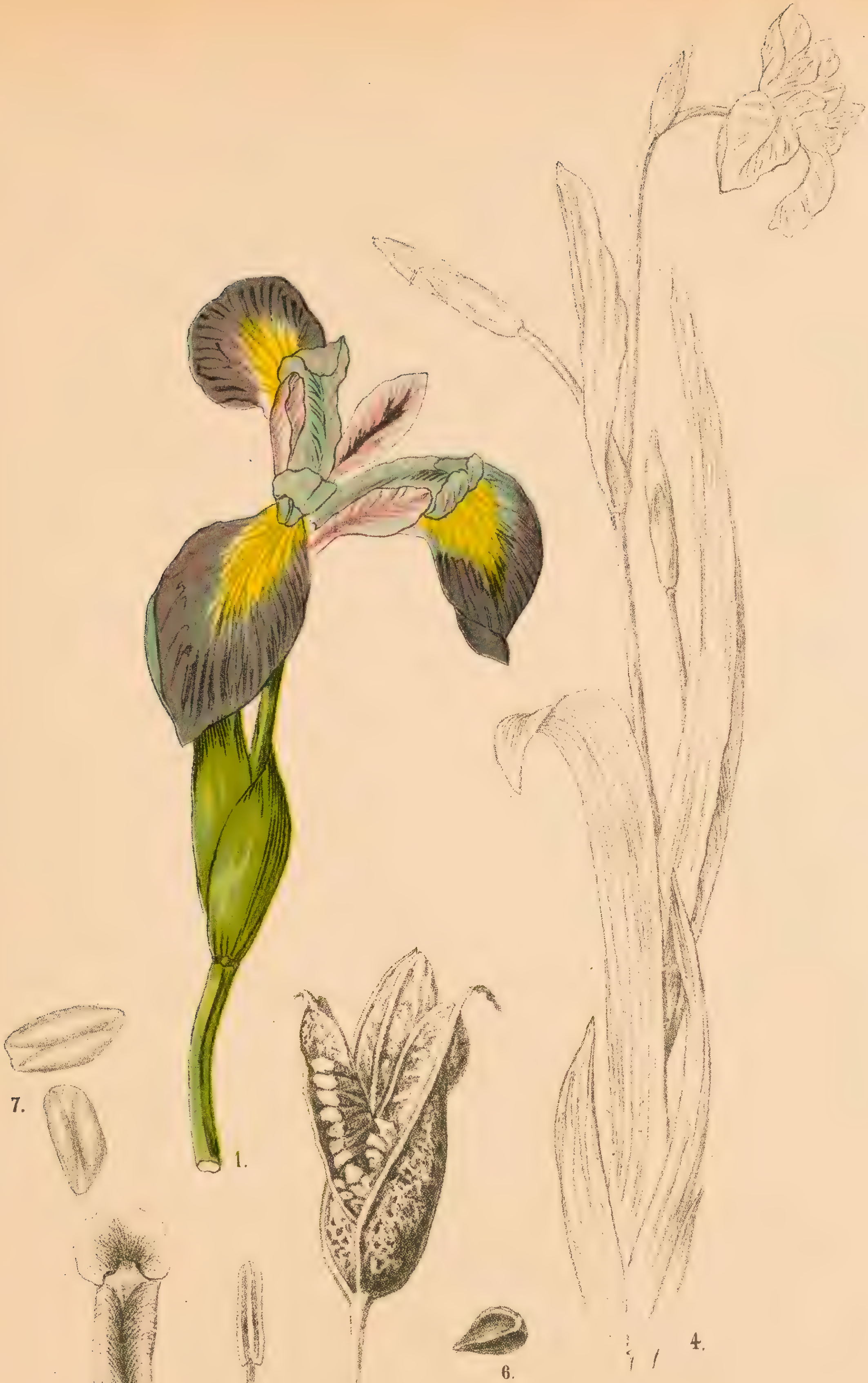
* Clayton, *Lond. Philosoph. Trans.*, 333.

† *Journ. Mat. Med.*, N. S., 2, 231.



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IRIS VERSICOLOR, Linn.

GENUS.—**IRIS**,* LINN.

SEX. SYST.—TRIANDRIA MONOGYNIA.

IRIS VERSICOLOR.

LARGER BLUE FLAG.

SYN.—IRIS VERSICOLOR, L., IRIS AMERICANA VERSICOLOR, DILL.

COM. NAMES.—BLUE FLAG, FLOWER-DE-LUCE, FLAG LILY, LIVER LILY; (FR.) GLAIEUL BLEU; (GER.) VERSCHIEDENFARBIGE SCHWERTLILIE.

TINCTURE OF THE FRESH ROOT OF IRIS VERSICOLOR, LINN.

Description.—This beautiful perennial bog plant attains a height of from 2 to over 3 feet. *Root* fleshy, thickened, horizontally creeping, giving off from two to four lateral branches, the under surface especially about the annual joints is thickly beset with simple fibrous rootlets. The joints vary from 1 to 4 inches in length, are flattened upon the upper surface, and from three-quarters to one and a quarter inches in breadth. The root is annulated by the scars of previous leaves. The *stem* is terete, angled on one side, rounded on the other, flexuous, simple or sometimes branched. *Leaves* sword-shaped, striate, erect, clasping at the base, one to one and one-half feet long, and one-half to one inch wide. *Flowers* 2 to 6 on each plant, spathacious, large and attractive, peduncles short, flattened on the inner side. *Calyx* tube funnel-form, prolonged more or less beyond the ovary, shorter than the three divisions (*sepals*) which are reflexed or spreading and destitute of beard or crest; the three inner divisions of the perianth (*petals*) are erect, and shorter than the sepals. *Stamens* 3, distinct, their *anthers* oblong-linear, hidden under the petaloid branches of the style. *Ovary* obtusely triangular with flattened sides, 3-celled, each containing numerous anatropous ovules. *Pollen* grains large, much resembling date stones in form. *Style* mostly connate with the tube of the perianth, its three branches petal-like, crenate, and more or less reflexed at the tip, each branch bearing a true *stigma* as a thin lip or plate, on the under surface of its apex. *Pod* leathery, 3 to 6 angled, 3-valved. *Seeds* triangularly depressed-flattened. *Embryo* straight in the hard fleshy albumen. IRIDACEÆ is represented in gardens by the *Crocus*, *Gladiolus* and tiger-flower (*Tigridia*), and wild in the United States by *Iris*, *Pardanthus* and *Sisyrinchium*.

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* Ἶρις, *rainbow deified*, applied by the ancients on account of the bright and diversified colors in the blossoms of this genus.

History and Habitat.—This beautiful flower abounds throughout the United States in wet places, blossoming from May to June. Iris was highly esteemed by the Aborigines of this country, as a remedy for gastric disturbances, and also by laymen as a domestic remedy, when ptyalism was considered necessary.

The fresh root pounded to a pulp is considered, and justly, one of the best poultices that can be applied to a felon, often quickly relieving the pain, even when suppuration is far advanced. It will generally too discuss the affection, if applied early in its development.

Iris is officinal in the U. S. Ph. as *Extractum Iridis* and *Extractum Iridis Fluidum.* In the Eclectic Materia Medica it is used as above, and as *Tinctura Iridis.* It is also a component of *Syrupus Stillingiæ Compositus.*

PART USED AND PREPARATION.—The fresh root. The rhizome of Iris is so often confounded by laymen with that of calamus, that a comparison might be considered in place.

Iris (*Blue-flag*).	Calamus (*Sweet-flag*).
Root horizontal, its sections flattened above. Annular by the scars of leaf-sheaths. The scars of the rootlets crowded mostly near the larger end, on the rounded side. When dry it is grayish-brown externally, and grayish or brownish internally, having a nucleus sheath enclosing a number of scattering bundles of woody fibres. No specific odor, acrid and nauseous to the taste.	Root horizontal, nearly cylindrical. Leaf-sheath scars obliquely transverse. The scars of the rootlets upon the under surface are quite regularly arranged in single or double lines that branch alternately, first to one side then to the other. Pinkish or pale-red internally, wood bundles scattered irregularly. An agreeable aroma and a pleasant taste characterize it.

The fresh root, gathered late in autumn or early in spring, is chopped and pounded to a pulp and weighed. Two parts by weight of alcohol are taken, and after thoroughly mixing the pulp with one-sixth part of it, the rest of the alcohol is added. After having stirred the whole, pour it into a well-stoppered bottle, and let it stand eight days in a dark, cool place. The tincture is then separated by decanting, straining, and filtering.

Thus prepared it has a light straw-color by transmitted light, at first a stinging, soon followed by a decided bitter taste, and a very slight acid reaction.

CHEMICAL CONSTITUENTS.—Several analyses of the root of Iris have been made, and all without success as regards the true and specific active principle. D. W. Cressler (Jour. Phar. 1881, 601) arrives at the conclusion that very probably an alkaloid exists in the roots; he also succeeds in extracting a volatile matter, starch, gum, tannin, and fixed oil.

Irisin or *Iridin*, an acrid resinoid body, results as a constant factor in all the analyses so far made. It occurs as a dark red-brown, viscid liquid, with an odor and taste resembling that of the root.

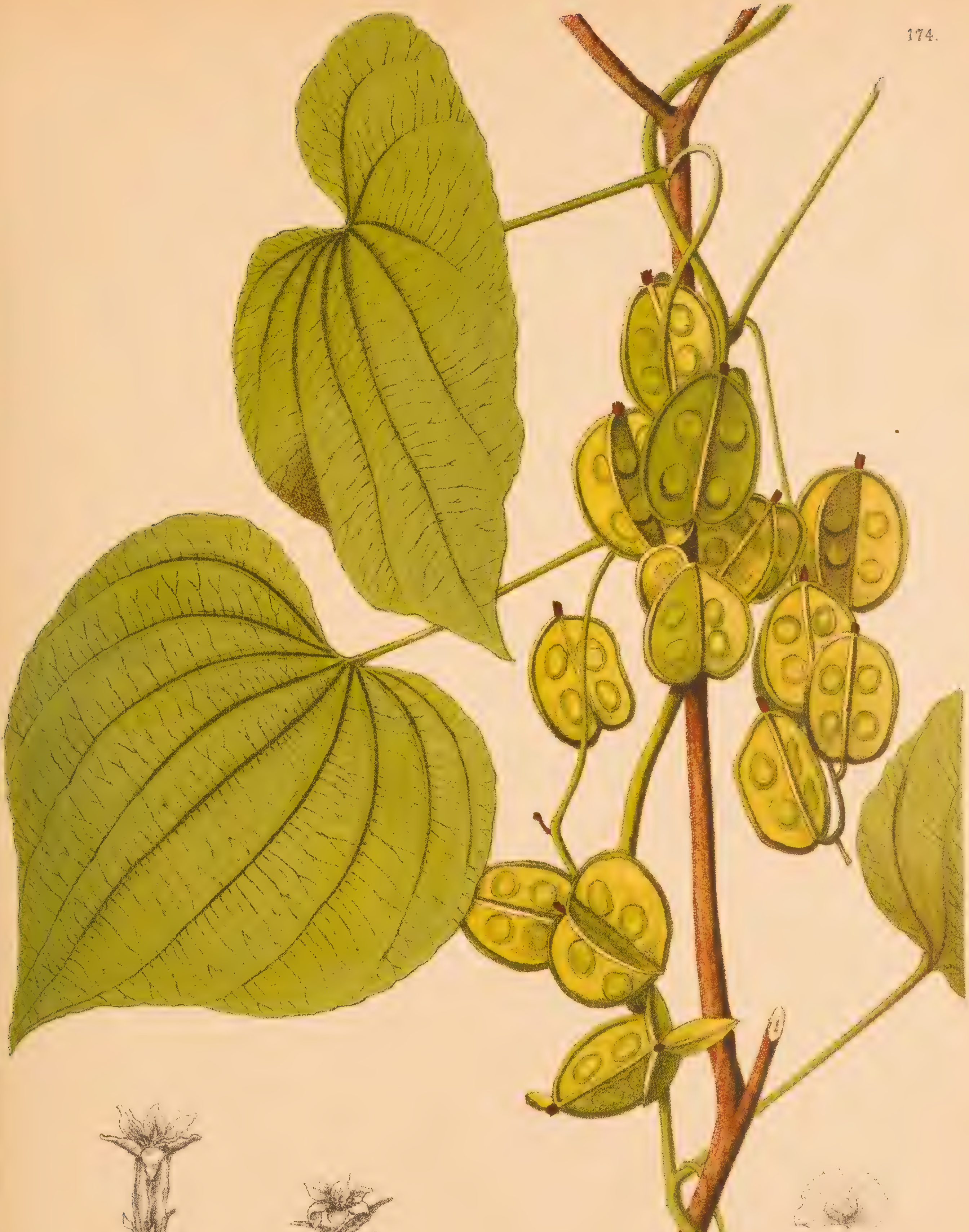
PHYSIOLOGICAL ACTION.—Iris acts powerfully upon the gastro-intestinal tract, the liver, and especially the pancreas; causing burning sensations and a high state of congestion, as proven by post-mortem examinations of animals after the exhibition of the drug.

It is an excitant of the salivary and biliary secretions, being therefore an excellent remedy to be thought of in ptyalism and obstinate constipation.

The gastro-intestinal effects are: profuse acid vomitings, and frequent watery evacuations, the latter accompanied by severe colic and burning. Upon the nervous system its action is marked, as shown by the severe toxic neuralgias of the head, face, and limbs.

Description of Plate 173.

1. Flower.
2. A branch of the style.
3. Stamen.
4. Whole plant three times reduced, Ithaca, N. Y., May 31st, 1880.
5. Fruit.
6. Seed.
7. Pollen grains x 200.



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DIOSCORÈA VILLÒSA, Linn.

GENUS.—**DIOSCOREA**,* PLUM.

SEX. SYST.—DIŒCIA HEXANDRIA.

DIOSCOREA.

WILD YAM.

SYN.—DIOSCOREA VILLOSA, LINN.; D. QUATERNATA, WALT.; D. PANICULATA, JACQ.

COM. NAMES.—WILD-YAM ROOT, COLIC ROOT, RHEUMATISM ROOT,† DEVIL'S BONES; (FR.) IGUAME INDIGENÉ; (GER.) WILDE YAM.

A TINCTURE OF THE ROOT OF DIOSCOREA VILLOSA, LINN.

Description.—This herbaceous, never villous twiner, usually attains a growth of from 5 to 15 feet over fences, bushes, and undershrubs. *Root* horizontal; *stems* solarly voluble, slender. *Leaves* variously arranged, those at the base of the plant sometimes in fours, those of the middle section nearly opposite, while the upper are alternate; *blade* ovate, 7- to 11-ribbed, more or less downy and grayish beneath; *base* cordate; *margin* entire or wavy; *apex* conspicuously pointed; *petioles* nearly the length of the blade and dilated at the base. *Inflorescence* in drooping, axillary racemes and panicles; *flowers* very small, diœcious, pale greenish-yellow. *Sterile flowers* in elongated panicles; *perianth* 6-parted; *lobes* oval; *stamens* 6, situated at the base of the lobes, included; *ovary* abortive, minute; *filaments* terete; *anthers* introrse; *cells* roundish, distinct. *Fertile flowers* in simple racemes; *perianth* tubular; *limb* cut into 6 rounded segments; *stamens* 6, abortive; *ovary* oblong, sharply triangular, 3-celled; *ovules* 1 to 2 in each cell, pendulous, anatropous; *styles* very short, bifid. *Fruit* an oval, 3-celled, 3-winged, membranaceous pod; *dehiscence* loculicidal into 3 valves by splitting through the winged angles. *Seeds* winged, plane, semi-conoid, 2 in each cell; *embryo* somewhat pyriform, compressed.

Dioscoreaceæ.—This small natural order is represented in North America by this species only, 7 genera and about 150 species being all the representatives known upon the globe, and those are mostly tropical. The plants in general are known by the following characters: *Stems* twining; *roots* usually tuberous, large, or sometimes horizontal and knotted. *Leaves* with a few conspicuous, parallel ribs, otherwise closely-netted, veined; *petioles* always present. *Inflorescence* usually in axillary racemes or racemose panicles. *Flowers* regular. *Male flowers: peri-*

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[*] Dedicated to Pedacius Dioscorides, the Greek physician and naturalist.

[†] Rheumatism Root generally alludes to *Jeffersonia diphylla* (Berberidaceæ).

anth 6-cleft and calyx-like; *stamens* 3 or 6, perigynous; *filaments* subulate; *anthers* globose, introrse, 2-celled. *Female flowers: perianth* tubular, 3-margined, 6-cleft, adherent to the ovary; *ovary* 3-celled; *ovules* anatropous, 1 to 2 in each cell; *styles* 3, segregate or nearly so; *stigmas* linear, spreading. *Fruit* sometimes baccate, but usually a membranaceous, 3-angled or margined pod. *Embryo* minute; *albumen* cartilaginous.

No other species are used in medicine, but a few are worthy of mention here on account of their roots, which, when fresh, are juicy, irritant, and vesicating, but after prolonged boiling are rendered more or less pleasant, and always nutritious, from an abundance of starch. Of all the Yams yielded by this order, the pleasantest is the East Indian Sweet Yam (*Dioscorea sativa*, Linn.), next to which ranks the White Negro-Yam of India (*D. alata*, Linn.), which often reaches a weight of 30 pounds, and the Prickly Yam (*D. aculeata*, Linn.), which is the most generally cultivated form. The Ceylon White Yam (*D. bulbifera*, Linn.); the Japanese Yam (*D. Japonica*, Linn.); and the Indian Yam (*D. trifida*, Linn.), are also pleasant and edible. The East Indian Buck Yam (*D. triphylla*, Linn.), and the Tropical Devil's Yam (*D. dæmona*) remain nauseous, even after prolonged boiling, yet are eaten by the natives in times of need. The Yam is largely cultivated for food in Africa, East and West Indies, and the Southern United States, especially for, and by, the negroes. The roots grow often to a large size, are farinaceous, and considered to be easily digested; they are in general palatable, and are considered not inferior to any root at present in use. They are eaten in lieu of bread, boiled or baked, or dried and ground into flour for bread and puddings.

The Cape Hottentots' Bread (*Testudinaria elephantipes*, Burch) is often, in times of scarcity, eaten in lieu of Yams, but is a poor substitute. The root of the European Black Bryony (*Tamus communis*, Linn.), is used as a stimulating poultice; internally it is an acrid purgative, an emetic and diuretic, yet the young shoots are used in lieu of asparagus; and the Candian (*T. Cretica*, Linn.), is very similar in its properties.

History and Habitat.—Dioscorea is indigenous to North America, where it ranges from Canada and New England, to Wisconsin and southward; it is common, however, only in the South.

The root of Dioscorea Villosa, as it appears in commerce, is of two kinds, so obviously different that, for many years, one sort was thrown out by druggists as spurious. This discrimination so affected the gathering of the roots that what was considered the true root could no longer be procured in sufficient quantity. Diggers finally, on their side, protested and claimed that the two roots came from almost identical plants, and, in order to supply the trade, the wholesale druggists were compelled to accept, although under protest, the product as sent by the gatherers. Mr. C. G. Lloyd finally examined carefully into what made the difference in the rhizoma, and his decision created a new variety of the species which he called *var. glabra*. The differentiation is as follows:[*]

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[*] *Am. Disp., Suppl.*, 82, plate vii.

DIOSCOREA VILLOSA, LINN. *True Wild-Yam Root.*	DIOSCOREA VILLOSA, VAR. GLABRA, LLOYD. *False Wild-Yam Root.*
Plant, under general inspection, smaller than the next; isolated.	Larger; growing in dense clumps.
Leaves more sharply pointed, almost aristate; densely short pubescent beneath.	Sharply pointed; absolutely glabrous.
Rhizome horizontal, about ½ inch in diameter, oval, flattened above and below, seldom branched, but decidedly tubercled by small protuberances that appear like abortive attempts to branch; the upper surface is marked at intervals of about an inch with the scars of previous years' stems.	This rhizome resembles greatly that of Collinsonia Canadensis. It is found in thick, matted, rough clumps, the main portion contorted by the procession of branches, which are in themselves knotty and of the full diameter of the rhizome-axis itself; these branchings issue at an acute angle forward, and themselves bear for the most part the cup-shaped scars of former stem-growths.

My herbarium contains three female and four male plants in flower, and one fruiting specimen, representing the States of New York, Pennsylvania, Ohio, Virginia, and Georgia,—all sent to me by botanists, who designated each as *D. villosa;* according to the above differentiation, two of the females and one male, as well as the fruiting specimen, are *var. glabra*, Lloyd.

Dioscorea has held a place in domestic and general practice for a long period as almost specific in certain forms of bilious colic, in which it is promptly efficacious; it is also considered diaphoretic, emetic, and expectorant. As a visceral antispasmodic, and remedy for intestinal irritations, it has proved itself a valuable remedy in cholera morbus, spasm of the diaphragm, spasmodic asthma, dysmenorrhœa, and kindred afflictions.

Although the leaves of the chestnut are officinal in the U. S. Ph., the root of this valuable plant is not. In Eclectic Practice, the following preparations are used: *Decoctum Dioscoreæ*, and *Extractum Dioscoreæ.*

PART USED AND PREPARATION.—The fresh root of either form, that of the first year preferred, is gathered in September, and chopped and pounded to a pulp and weighed. Then two parts by weight of alcohol are taken, the pulp thoroughly mixed with one-sixth part of it and the rest of the alcohol added. After stirring the whole well, it is poured into a well-stoppered bottle, and allowed to stand for eight days in a dark, cool, place.

The tincture separated from this mass by straining and filtering, should have a deep amber color by transmitted light; a cherry-like odor; a taste at first woody, then bitter, and an acid reaction.

CHEMICAL CONSTITUENTS.—Dioscorea roots contain, without doubt, an acrid principle, resin, and starch, but as yet they have not been isolated. *Dioscorein* is not a principle, it being simply an extract embodying the solid constituents of the fluid extract of the root.

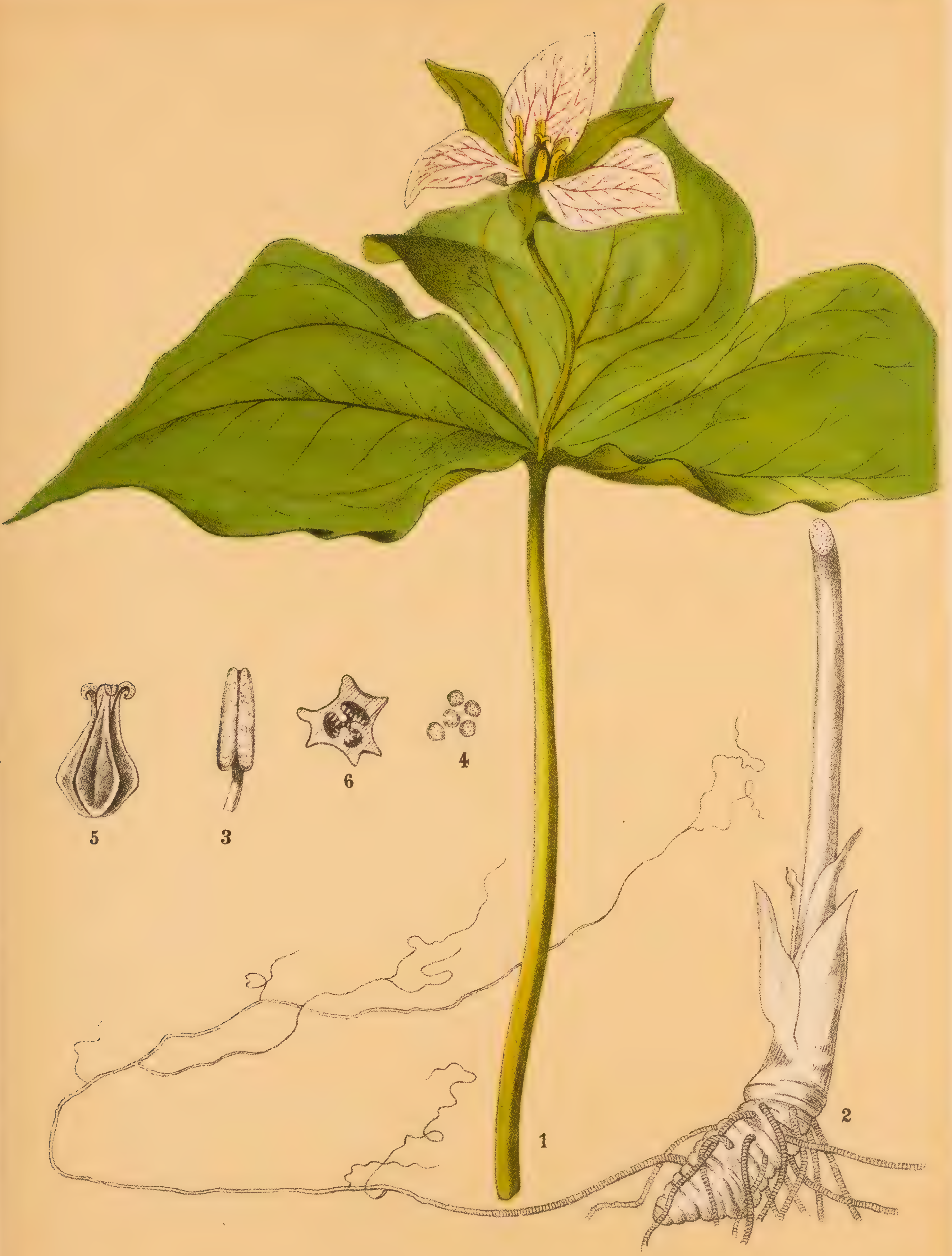
PHYSIOLOGICAL ACTION.—The experiments of Drs. Cushing and Burt, with doses of from 5 drops of the tincture to 200 drops of the fluid extract, gave essentially the following symptoms of disturbance: Vertigo and dizziness; heaviness and aching of the head; smarting and soreness of the eyes; irritation and congestion of the mucous membrane of the nostrils; tongue brown-coated, dry, and stiff; dryness of the mouth, followed by salivation; throat dry and sore; bitter and sour eructations and belchings; nausea, with burning distress, bloating, and cramps of the stomach, which becomes sore and feels raw; hard, dull, or sharp pains in the hepatic region; severe, dull, cutting, and griping pains in the umbilical region; severe abdominal pain, with much flatulent distention; very severe colic, with passage of large quantities of flatulence; itching of the rectum, with prolapsed hemorrhoids; profuse yellow diarrhœic stools; great sexual excitement, followed by loss of desire and nocturnal emissions; irritation of the bronchi and lungs; great lumbar pain and weakness; weakness of the extremities; general tired, weak, and faint feelings; itching of the skin; sleeplessness and chilliness.

Dioscorea proves itself an irritant of the mucous membranes in general, but especially those of the intestinal tract, and causes congestion and inflammation of those tissues if persisted in.

Description of Plate 174.

1. Portion of a fruiting stem, Pittsburgh, Pa., Aug. 20th, 1885.
2. Female flower.
3. Male flower.
4. Seed.

(2–3 enlarged.)



C.F.M. ad nat del. et pinxt.

TRÍLLIUM ERÉCTUM Var ÁLBUM Pursh.

Tribe.—TRILLIDEÆ.

GENUS.—**TRILLIUM**,* LINN.

SEX. SYST.—HEXANDRIA TRIGYNIA.

TRILLIUM.

BETHROOT.

TRILLIUM ERECTUM, LINN.

SYN.—TRILLIUM RHOMBOIDEUM, VAR. ATROPURPUREUM, MICHX.; TRILLIUM ATROPURPUREUM, BOT. MAG., TORREY; TRILLIUM ERECTUM, VAR. ATROPURPUREUM, PURSH.; TRILLIUM FŒTIDUM, SALISB.

COM. NAMES.—PURPLE TRILLIUM, BETHROOT, BIRTHROOT, LAMB'S QUARTER, GROUND LILY, RATTLESNAKE ROOT, WAKEROBIN, INDIAN BALM, THREE-LEAVED NIGHTSHADE, INDIAN SHAMROCK; (FR., GER.) TRILLIUM.

TRILLIUM ERECTUM, VAR. ALBUM, PURSH.

SYN.—TRILLIUM PENDULUM, AIT., WILLD.; TRILLIUM RHOMBOIDEUM, VAR. ALBUM, MICHX.

COM. NAMES.—(NOT SPECIFIC.)

A TINCTURE OF THE FRESH ROOT OF TRILLIUM ERECTUM, LINN.

Description.—Trillium erectum.—This common species of the genus is characterized as follows: *Leaves* just sessile, rhomboid, dilated, nearly as broad as long; *base* cuneiform or acute. *Flower* nodding, dull purple, raised upon a peduncle, and having a disgustingly fishy odor; *peduncle* 1 to 3 inches long, inclined. *Petals* plane, ovate, acutish, spreading, and caducous. *Sepals* acute, a little shorter than the petals.

Var. **Album.**—*Leaves* not so abruptly taper-pointed as in the species, broader and more fully sessile. *Flower* odorless, and averaging smaller; *peduncle* strongly curved. (The flower in the plate is constrainedly elevated to show the markings upon the petals and the color of the ovary); *petals* plane, greenish- or creamy-white, the veins and veinlets either green or purple.† *Ovary* deep, dull purple. *Stigmas* yellow.

Trillium.—This genus is composed of low, perennial herbs. *Roots* præmorse, tuber-like, circularly wrinkled, and giving off numerous long, primarily wrinkled, then smooth and branching, fibrous rootlets. *Stems* simple, smooth, stout, naked below, enlarged at the base, and furnished with several large, membranaceous, lanceolate, acute scales. *Leaves* 3, in a single whorl at the summits of the stems, broad and netted veined! *Inflorescence* single, terminal, sessile, or pedunculated; *flowers* large, white or purple, sometimes marked. *Petals* 3, larger than the sepals, withering; *sepals* 3, foliaceous, lanceolate, and spreading, persistent. *Stamens* 6; *filaments* short; *anthers* elongated, linear, adnate and introrse; *cells* 2, opening by a lateral, longitudinal fissure; *pollen* more or less globular, echinated. *Ovary* pyriform, 3–6 angled; *styles* 3, distinct down to the ovary, awl-shaped, recurved or spreading, persistent, stigmatic upon their faces. *Fruit* baccate, 3-celled. *Seeds* horizontal, a number in each cell, ovoid, with a tumid raphe; *embryo* minute; *albumen* dense, sarcous.

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* *Trilix*, *triple*, the parts of the plant being in threes.

† In *Trillium erythrocarpum*, Michx., the purple markings upon the petals are situated at their bases, and are broad, gradually narrowing, to cease in the middle. *Petals* wavy-edged.

Rafinesque, in his *Medical Flora*, made a grand revision of this genus, naming no less than 19 species, and 68 varieties, including 14 other species, and constituting 3 sub-genera; but Prof. Gray, in his *Lessons and Manual*, allows but 8 species and 2 varieties in the Northern States.

LILIACEÆ.—This large order of beautiful plants has representatives in all portions of the globe. It consists of herbs or sometimes woody plants springing from bulbs, tubers, or a fascicle of fibrous roots. *Leaves* simple, clasping at the base. *Perianth* not glumaceous, free from the ovary; *flowers* 6-androus, regular, and symmetrical; *sepals* and *petals* generally colored alike (Exc. Trillium); *stamens* 6, one at each division of the perianth; *anthers* 2-celled, introrse. *Ovary* 3-celled, free; *styles* united (Exc. Trillium); *stigmas* generally 3-lobed; *ovules* anatropous or amphitropous. *Fruit* a capsule or berry; *seeds* few or many in each cell; *embryo* minute; *albumen* sarcous.

This important family has been divided by botanists generally, into three, viz., *Melanthaceæ*, *Liliaceæ*, and *Smilaceæ*; other divisions have also been made. It will, however, answer best for us to speak of the drugs and useful plants here, under the headings as tribes or suborders, to agree with the general plan of the work as begun—*i. e.*, according to Prof. Gray's *North American Botany*. The useful plants of the *Melanthaceæ* are: The European white hellebore, *Veratrum album*, Linn.; the Mexican and West Indian Sabadilla, *Veratrum Sabadilla*, Retz. (*Asa Græ officinalis*, Lindl., *Schœnocaulon officinale*, Gray); the Mexican *Helonias officinalis*, Don (*Veratrum officinale*, Schl.), spoken of as a plant also furnishing cebadilla seeds, is accounted by Flückiger and Hanbury to be synonymous with *V. Sabadilla.* The root of the poisonous *savœja* of the Mexicans, *Helonias frigida*, Lindl. (*Veratrum frigida*, Schl.), appears to exactly resemble that of *V. album*;* the rhizomes of *Veratrum nigrum*, Linn., an Austrian species, are said to be substituted for white hellebore.† The narcotic poison *Helonias erythrosperma*, Michx. (*Melanthium muscætoxicum*, Walt.), is said to be used in the Southern States as an insecticide. Concerning this property, Porcher says,‡ the insects are only stupefied, and are generally burned in that state by housewives. The Indian cucumber, *Medeola Virginica*, Linn., has been used as a diuretic; *Melanthium Virginicum*, W., is an irritant poison, formerly used as an application in itch. The meadow saffron, *Colchicum autumnale*, Linn., is also a member of this section. Veratrum viride, Helonias dioica and Trillium are represented in this work. *Liliaceæ* proper. Under this head are classed the Aloë, Squillæ, Allia, etc. Squills, *Squilla* and *Scilla maritima*, Stein., Linn., come to us from the Mediterranean coasts; a milder form, *Squilla Pancration*, Stein., thought to be the Pancration of Dioscorides, is found, with the previous form, especially at Malta. Other forms of squills are the South African *Urginea altissima*, Baker, the North African *Scilla Indica*, Roxb., and the Abyssinian *Scilla Indica*, Baker. Nearly allied forms, with varied properties, are the Cape Itch-bulb, *Drimia ciliaris*, Jacq., and the Indian emetic, *Crinum toxicarium*, Roxb. The common or Barbados Aloe is the North African *Aloe vulgaris*, Lam. (*A. Barbadensis*, Mill.). The Socotrine Aloe is a product of *Aloe Socotrina*, Lam. (*A. vera*, Miller), growing upon the southern shores of the Indian Ocean, Red Sea, and Island of Socotra. Cape Aloes are said to be derived from *Aloe ferox*, Linn., *Aloe Africana*, Mill., *Aloe spicata*, Thun., *Aloe linguæformis*, *Aloe arborescens*, Mill., *Aloe Commelini*, Willd., and *Aloe purpurascens*, Haw. *Allium sativum*, Linn., the common garlic, is of uncertain nativity; *Allium cepa*, Linn., the common onion, is a native of Egypt; other allied species are the Leek, *Allium porrum;* the Echalotte, *Allium ascalonicum;* Chives, *Allium schænoprasum;* Rocambole, *Allium scodoprasum;* the Southern Wild Garlic, *Allium Carolinianum;* and the Meadow Garlic, *Allium Canadense.* The dog's-tooth violet, *Erythronium Americanum*, Ker., was offered by Bigelow as a substitute for Colchicum; the Indian *Erythronium Indicum* is used against equine strangury (Ainslie); and the bulbs of the European *Erythronium Dens canis* as a food in Siberia (Pallas). The Lily of the Valley (*Convallaria majalis*, Linn.), a plant whose reputed value in some forms of cardiac diseases is at present before the profession, belongs to this section. The bulbs of *Tulipa gesneriana*, like many other liliaceous bulbs, are used for cataplasms; those of *Tulipa sylvestris* are emetic (Poiret); those of *Fritillaria imperialis*, and *Gloriosa superba*, are violent poisons; while those of *Calochortus elegans* and various species of the genus *Lilium*, form nutritious foods. The North American Indians use as foods the following species under this order: *Kamass root* (*Cammassia esculenta*) is eaten raw or cooked; in the latter form it is said to resemble the potato. These roots also yield a very good molasses when boiled in water, and are greatly esteemed by the Nez Perces, Pitt River, and Cape Flattery Indians. Spanish bayonet (*Yucca baccata*): This spinous-leaved plant yields a fruit that nearly resembles in size and shape the West Indian banana. The Indians of Arizona, Utah, and New Mexico are very fond of these fruits, which they either eat fresh, or dry and preserve when ripe, and roast when green together with the young flower buds.* African hemp is a product of several species of *Sanseviera* (Griffith), and New Zealand hemp of *Phorimum tenax*. Dragon's-blood, an astringent resin, long used, is a product of that famous East Indian tree, *Dracæna Draco*. Various pot-herbs are found in this family, the principal ones being *Asparagus officinalis*, *Asparagus acutifolius*, and the South Sea Island Ti-plant, *Cordyline terminalis*. The *Smilaceæ* yield Jamaica sarsaparilla, *Smilax offici-*

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* Flück. & Han. *Pharmacographia*, p. 695.

† *Ibid.*

‡ *Resourc. South. Field and For.*, p. 527.

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* J. R. Dodge, in *U. S. Agric. Rep.*, 1870, pp. 408, 418.

nalis, Kunth.; Vera Cruz or Honduras sarsaparilla, *Smilax medica*, Schl. & Cham.; and Brazilian sarsaparilla, *Smilax syphilitica*, Willd. (Pereira). Many other so-called sarsaparillas are derived from various species scattered throughout the more tropical regions of the world. The Javanese China-root, *Smilax China*, Linn., is a noted alterative; its substitutes and supposed analogues are: the Brazilian *China branca e rubra*, *Japicanga* or *Ihapecanga*, *Smilax glauca*, Mart.; the Sylhetian *Smilax glabra*, Roxb.; the Indian *Smilax*, *lanceæfolia*, Roxb.; the sweet-tea of New Holland, *Smilax glycyphylla*, Smith; and the American China-root, *Smilax Pseudo-China*.

History and Habitat.—Trillium erectum is one of our common indigenous plants, ranging from North Carolina northward. It grows in damp, rich, well-shaded woods, and flowers in the month of May. The variety *album* is not common eastward; it habits the same localities, and flowers a little later.

Concerning the properties of this genus, Rafinesque, who claims to introduce it into Materia Medica, says:* "Almost all the species may be used indifferently, although the Indians have a notion that those with red blossoms (which they call male) are the best, and those with white blossoms (called female) are best for women's complaints. The species most commonly used, because most common, are the *T. nutans* (*i. e. T. erectum*), *T. pictum* (*T. erythrocarpum*), *T. grandiflorum*, *T. medium*, (*T. cernuum*), etc. They are all astringent, restringent, pectoral, tonic, antiseptic, alterative, etc. They are employed internally in hematuria, uterine hemorrhage, metrorrhagia, hematemesis, etc. The Indians of Canada and Missouri value the roots much in leucorrhœa, menorrhœa, and as a restringent after parturition." The use of the tubers as an external application in ulcers, inflamed swellings, sores, etc., is similar to that of the liliaceæ in general. On account of the acridity of the roots they have been used to promote ptyalism, and are claimed to check epistaxis when a newly-cut root is held to the nose and the acridity inspired.

Trillium is not officinal in the Pharmacopœias.

Pharmacy.—Considerable doubt exists among our authors and pharmacists concerning which species of this genus should be used for our tincture. I therefore consider it full time, and this the place, to settle upon the most proper source of the drug. Dr. Minton, the original prover—whose MS. is printed in the *Encyclopedia*, under Trillium cernuum†—informs me that he procured his tincture for proving "from a botanic physician, long since dead;" the species used and the mode of preparation are uncertain. The *American Homœopathic Pharmacopœia*‡ directs the use of *T. pendulum*, Ait., and describes no distinct species, but approaches nearer *T. cernuum* than any other. Dr. E. M. Hale says:§ "From the remarks of Dr. John King, in the *Eclectic Dispensatory*, we learn that it is a matter of indifference which, or how many, species of Trillium go to make up the preparations in use in that school. It is my conviction that no reliable knowledge can be gained by using a preparation made in this loose manner. For use in disease, some definite, reliable tincture, made from a single species should be used. I am satisfied, however, from my inquiries, that none of the tinctures or triturations now in use by homœopathists is prepared from the Trillium pendulum alone. We must adopt one of two methods—either one species exclusively, or several combined in exact proportions."

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* *Medical Flora*, 1830, pp. 102–3.

† *Encyclopedia of Pure Mat. Med.*, Allen, vol. x, p. 637.

‡ Second edition, p. 442.

§ *Hale's New Remedies*, 4th ed., vol. i, p. 629.

On account of its wide range, prolific growth, acridity and evident strength, I deem *Trillium erectum, Linn.*, the common purple Trillium, the proper species for homœopathic use. In this I am upheld by Dr. T. F. Allen and others of our most thorough botanically educated physicians. I am assured also that our most important pharmacies in the East use this species, under the label *T. pendulum; one pharmacy only* using *T. pendulum*, Ait.

In regard to the frequency of the species of Trillium in this State (New York), taking *T. grandiflorum* to be the most common, and giving it the value 10, the value in occurrence of the other species in proportion—according to my personal observations—would be:

T. erectum 9, *T. cernuum* 6, *T. pendulum*, Ait., 3, *T. erythrocarpum* 2, and *T. sessile* 1.

PART USED AND PREPARATION.—The fresh tubers should be chopped and pounded to a pulp and weighed. Then two parts by weight of alcohol are taken, the pulp mixed thoroughly with one-sixth part of it, and the rest of the alcohol added. After having stirred the whole well, pour it into a well-stoppered bottle, and allow it to stand eight days in a dark, cool place.

The tincture, separated from this mass by filtration, should have a light, slightly brownish-orange color, by transmitted light, no distinguishing odor nor taste, an acid reaction, and should raise a soap-like foam on shaking. This tincture will deposit a heavy cream-colored sediment on standing, which can be filtered off without detriment to it. This sediment, when dried, forms an amorphous mass, without odor or taste, and answers to none of the starch tests. It is insoluble in water, alcohol, ether, alkalies, or acids to any extent; melts at 249° (480.2° F.), and burns at a higher temperature with a bright yellow flame, leaving no ash.

CHEMICAL CONSTITUENTS.—*Trilline.* Prof. E. S. Wayne* separated from a tincture of Trillium, a dry, whitish, amphorous, pulverable, powerfully acrid mass, soluble in alcohol, and forming, when shaken with water, a permanent, opaline, frothing, soap-like mixture. A tincture of this body, spread thinly on glass, formed a bright glistening scale.

He also separated a volatile oil, gum, resin, extractive, tannic acid and starch.

I have followed his line of procedure and corroborated his analysis in full, having, however, too small quantities of the resultants to further experiment upon. I shall, next season, analyze the tubers of Trillium erectum and other species, to better settle upon the qualities of this genus, and determine, if possible, its most representative species.

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* *Am. Jour. Phar.*, 1856, p. 512.

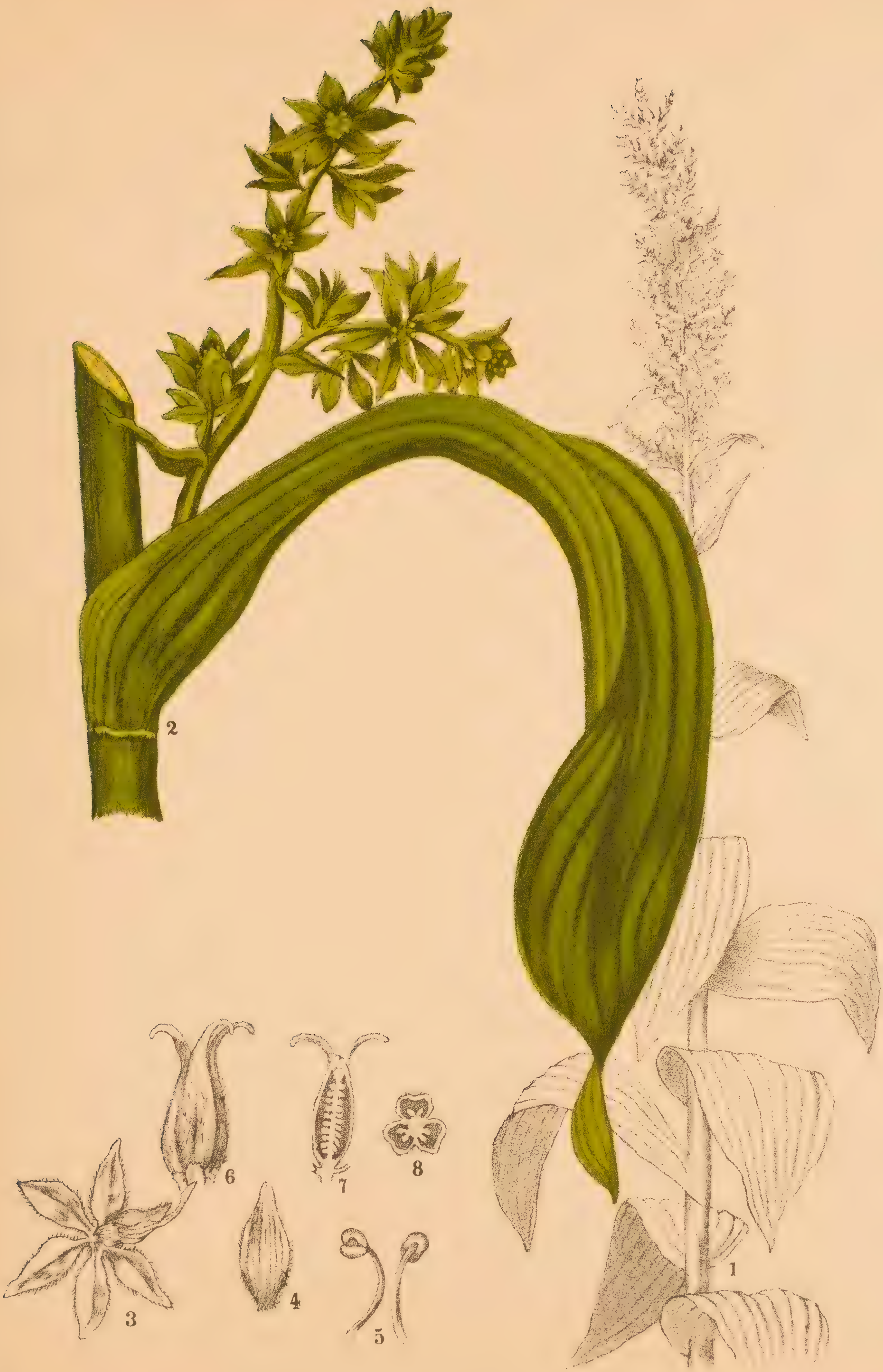
PHYSIOLOGICAL ACTION.—We have a careful proving of Trillium by Prof. Henry Minton, as before mentioned, and some excellent clinical experience; the full action, however, is not yet determinable from these. This certainly is a drug deserving full and careful study and proving, and I promise the fraternity to do my share as fully and promptly as time and material shall render possible.

DESCRIPTION OF PLATE 175.

Trillium erectum, var. album.

TRILLIUM PENDULUM, AIT.

1. Upper portion of plant, Binghamton, N. Y., May 12th, 1884.
2. Lower portion and root.
3. Stamen (enlarged).
4. Pollen x 280.
5. Pistil (enlarged).
6. Ovary in horizontal section (enlarged).



CF.M. ad nat del.et pinxt.

VERÀTRUM VÍRIDE, Ait.

Tribe.—*MELANTHIEÆ.*

GENUS.—**VERATRUM,*** TOURN.

SEX. SYST.—POLYGAMIA MONŒCIA.

VERATRUM VIRIDE.

AMERICAN WHITE HELLEBORE.

SYN.—VERATRUM VIRIDE, AIT.; V. ALBUM, MICHX. (NOT LINN.); V. ALBUM, VAR. (?) REGEL; V. PARVIFLORUM, BONG. (NOT MICHX.); V. ESCHSCHOLTZII, GRAY; HELONIAS VIRIDIS, BOT. MAG. 1096.

COM. NAMES.—AMERICAN WHITE HELLEBORE, FALSE HELLEBORE, INDIAN POKE, MEADOW POKE, SWAMP HELLEBORE, ITCH WEED, INDIAN UNCUS, PUPPET ROOT, EARTHGALL, CROW POISON; (FR.) VÉRATRE VERT; (GER.) GRÜNER GERMER.

A TINCTURE OF THE FRESH ROOT OF VERATRUM VIRIDE, AIT.

Description.—This pubescent perennial grows to a height of from 2 to 5 feet. *Root* coarse, thick, fleshy, and more or less horizontal; the lower part throwing off numerous white fibres. *Stem* erect, simple, stout, and leafy to the top. *Leaves* 3-ranked, broadly oval, and strongly pointed, plaited, clasping by a sheathed base, and gradually decreasing in size upward to mere lanceolate bracts. *Inflorescence* a terminal pyramidal panicle, 8 to 18 inches long, composed of dense, spike-like, spreading, loosely floral racemes; *flowers* monœciously polygamous, greenish or olivaceous green. *Sepals* 6, ovate-oblong, moderately spreading, separate, contracted at the base, clawless and glandless, and entirely free from the ovary. *Stamens* 6; *filaments* free from, and shorter than, the sepals, recurving; *anthers* extrorse, reniform, confluently 1-celled at the apex. *Ovules* ascending, anatropous; *styles* none; *stigmas* 3, ligulate, separate down to the ovary, recurved. *Fruit* a 3-horned and carpelled, septicidal capsule; *seeds* 8 to 10 in each carpel, flattish-oblong, with a broad membranaceous margin and an acute apex; *embryo* oval; *albumen* sarcous.

Although much like the *V. album* of Europe in its minor points, yet our species is strikingly different in general appearance. The American species has a much more pointed leaf and its panicle looser and more compound; the racemes of *V. album* being compact, and, as a whole, cylindrical; while those of *V. viride* are scattered, compounded, and scraggly.

History and Habitat.—Veratrum viride is indigenous to North America, where it habits low grounds from Canada southward to the mountain meadows of Georgia, flowering in the north in July, and in the south in April or May.

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* *Vere*, truly; *atrum*, black.

There are four other North American species of Veratrum, all of which may be compared with the species under consideration.

The first account we have of the use of this plant is that of Josselyn[*] (1638), who speaks of the use of the root as an ordeal by the young Aborigines in the selection of their tribal chiefs—"he whose stomach withstood its action the longest was decided to be the strongest of the party, and entitled to command the rest." Kalm (1749) states[†] that at the time of his visit here the people used a decoction of this plant externally in the cure of scorbutic affections, and to destroy vermin. He also states that corn was soaked in a strong decoction of the root before planting, to protect it against birds, and observed that birds, after eating of this corn, became attacked with vertigo, and in their blind struggling frightened away the balance of the flock; those who ate of the grain, however, recovering from its effects. The first prescriber of the drug in regular practice was probably Dr. John Ware,[‡] who used it in the Boston Almshouse in cases of tinea capitis. Dr. Bigelow states[§] that during the Revolutionary War, when *V. album* could not be procured, various gouty patients used the American plant with success, not finding a point of difference. It is doubtless right to give Dr. Norwood, of South Carolina, the credit of establishing the proper method of administering the drug,[||] and it was through his use in part that its employment began in England in 1862. Although Dr. Ware was probably the first to experiment with this drug to gain an idea of its physiological action, Drs. Tully and Ives (1830) were the first to investigate its therapeutic action as well. Dr. Charles Osgood, who studied under Professor Tully—modestly giving the professor most of the honor of learning its properties—wrote an excellent essay upon the drug in 1835.[¶] Little attention, however, seemed to follow this essay until Dr. Norwood's paper appeared in 1851, from which time the drug gained gradually the prominence it now holds, principally through the efforts of Prof. Samuel Percy in 1856, Drs. Miller, Belden, Cutter, Richard (1858), Ingalls, and Prof. M'Gugin of Iowa (1861).

The principal uses of the drug were as a depressor of the heart's action wherever it was deemed necessary, and an application and internal remedy in arthritic troubles of all kinds; its officinal preparations in the U. S. Ph. being *Extractum Veratri Viridis Fluidum* and *Tinctura Veratri Viridis*.

PART USED AND PREPARATION.—The fresh root, gathered after the leaves have fallen in autumn, is treated as in the preceding drug, excepting that *dilute* alcohol is used.

The resulting tincture has a brilliant, slightly orange, madder color by transmitted light; a peculiar rich odor and taste; and an acid reaction.

CHEMICAL CONSTITUENTS.—Dr. Chas. Osgood[**] and Thos. A. Mitchell[††] were the first to suspect by analysis that the alkaloid commonly known as Veratrine existed in the species viride, and H. W. Worthington[‡‡] the first to assert the fact. From this time the chemistry of the plant became a great study by many, principally G. J. Scattergood (1862),[*] Chas. Bullock (1865[†] and 1879),[‡] Prof. G. B. Wood, E. Peugenet (1872), C. L. Mitchell (1874), Robbins (1877),[§] and Wright and Luff (1879).[||] The results of these studies show a similarity in this species to *V. album* of Europe; tabulated from the observations of Wright and Luff, as follows. One kilogramme of the roots of each species yielded:

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[*] *New England Rarities Discovered*, Lond., 1672, p. 46; *Account of Two Voyages to New England*, 1674, pp. 60–76.

[†] *Travels in North America*, vol. ii.

[‡] Communication to Dr. Bigelow.

[§] *Am. Med. Bot., loc. cit.*

[||] 5 to 8 drops of the tincture, as advised in this work.

[¶] *Am. Jour. Med. Sci.*

[**] *Am. Jour. Phar.*, vol. i, series 2.

[††] Ibid., vol. ix.

[‡‡] Ibid., vol. x, p. 110.

	V. album.	*V. viride.*
Jervia,	1.30	0.20
Pseudojervia,	0.40	0.15
Rubijervia,	0.25	0.02
Veratralbia,	2.20	traces
Veratria,	0.05	0.004
Cevadina,	(?)	0.43
	4.20	0.804

Jervia, $C_{26}H_{37}NO_3$.—This amorphous alkaloid (the *viridia* of G. B. Wood) forms an almost insoluble sulphate, crystallizing with two molecules of water, melting at 239° (462.2°, F.), and giving with sulphuric acid almost the same coloration as the next.

Pseudojervia, $C_{29}H_{43}NO_7$.—A snow-white base, crystallizing anhydrous from alcohol, melting at 299° (570.2°, F.), and giving a yellow solution with sulphuric acid, gradually turning green.

Rubijervia, $C_{26}H_{43}NO_2$ —A base forming a readily-soluble sulphate and well-crystallized salts in general. It melts at 237° (458.6°, F.), and resembles in many ways the preceding; it, however, gives with sulphuric acid a red coloration.

Veratralbia, $C_{28}H_{43}NO_5$.—This base gives a red coloration with sulphuric acid, and greatly resembles cevadina and the veratria of other authors.

Cevadina, $C_{32}H_{49}NO_9$.—An amorphous mass, greatly resembling the veratralbia of *V. album*, and termed the sternutatory property of V. viride.

The above digest of Wright and Luff's analysis is anything but satisfactory, and is open to much criticism as regards its solution of the problem still before us. The following latest analysis of the Veratrine of *V. album*, by Dr. Emil Bossetti,[¶] will serve to throw some light upon the complex nature of the principles of this genus. First: he claims that veratrine is a homogeneous mixture of two isomeric alkaloids; these he designates as insoluble

Veratrine, $C_{32}H_{49}NO_9$.—A crystallizable alkaloid (the cevadina of Wright and Luff), insoluble in water, which decomposes on boiling with an alcoholic solution of barium hydrate,[**] into angelic acid, $C_5H_8O_2$, and

Cevadine, $C_{27}H_{45}NO_9$.—An amorphous, yellowish-white powder, having an alkaline reaction and a peculiar sweetish taste.

The other isomer soluble veratrine, or

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[*] *Am. Phar. Assoc.*, Aug., 1862, p. 226.

[†] *Am. Jour. Phar.*, 1865, p. 321.

[‡] Ibid., 1879, p. 337.

[§] *Am. Phar. Assoc.*, 1877, pp. 439, 523.

[||] *Phar. Jour. and Trans.*, May 31, 1879.

[¶] *Arch. der Pharm.*, 21, p. 81.

[**] $\overset{\text{Veratrine.}}{C_{32}H_{49}NO_9} + \overset{\text{Water.}}{(H_2O)_2} = \overset{\text{Angelic Acid.}}{C_5H_8O_2} + \overset{\text{Cevadine.}}{C_{27}H_{45}NO_9}$.

Veratridine, $C_{32}H_{49}NO_9$.—An uncrystallizable alkaloid (the soluble veratrine of Weigelin and E. Schmit), soluble in water, and decomposing when boiled with an alcoholic solution of baryta water* into veratric acid, and

Veratroine, $C_{55}H_{92}N_2O_{16}$.—A body forming, after dehydration and trituration, a yellowish-white powder, the dust of which causes coughing and sneezing. It is sparingly soluble in water, but readily soluble in chloroform, ether, amylic alcohol. benzol, and carbon bisulphide; therefore answering fully to C. L. Mitchell's *veratroidia* as obtained from *V. viride,* to which Tobien gave the formula $C_{51}H_{78}N_2O_{16}$.

Veratric Acid, $C_9H_{10}O_4$, crystallizes in colorless needles, losing their water of crystallization on heating, and sublimes completely at high temperatures. This body is soluble in water and alcohol, and insoluble in ether.

PHYSIOLOGICAL ACTION.—*On Animals.*—Dr. Percy's experiments upon dogs and frogs show finely the action of the drug. From his prize essay from the *Am. Med. Assoc.,* 1863, I have selected two of the more prominent cases:

"EXPERIMENT VII.—Into the cellular tissue of the right lumbar region of a mongrel dog weighing sixteen pounds was passed, by Wade and Ford's hypodermic syringe, ten minims of the concentrated tincture. The pulse at the time was 110. The movements soon became uneasy and unsteady. In eighteen minutes the dog vomited, and the pulse was reduced to 63. In thirty-four minutes the dog staggered, lay down, and was unable to rise, the retching continuing frequent. In thirty minutes the dog lay completely on its side, and the saliva flowed very freely from his mouth. The eye was dull, the pupils widely dilated, but fixed; but the eye closed if the cornea was touched. The limbs were very flaccid, the pulse 32. Ten minims more of the same tincture were now injected into the left lumbar region. In forty-five minutes from the first injection, the heart was beating 14 in the minute, and very irregular; the saliva continued to flow freely from the mouth, being almost as limpid as water. *The dog was perfectly insensible to pain.* The respirations were slow but full. At one hour from the first injection, the heart merely fluttered; the dog could be moved in any way without the slightest *voluntary* motion. The urine and feces were passed involuntarily.

"EXPERIMENT I.—Ten minims of a solution containing ⅓ gr. of the alkaloid veratria made from veratrum viride, by Mr. George Scattergood, of Philadelphia, were given to a large dog weighing about thirty pounds, in gelatine capsules; great care was taken that none of it escaped into the mouth.

3.35	P.M.		Pulse 150
4	"	salivation very profuse.	" 148
4.05	"	vomited.	" ——
4.20	"	vomiting very frequently.	" 140
4.45	"	vomiting viscid mucus and bile.	" 128
5.20	"	prostration very great, unable to stand.	" 122
5.45	"	pupils widely dilated, eyes fixed.	" 122
6	"	prostration great, profuse salivation.	Intermittent
9	"	walking about, but sober and dejected.	" 112

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* $\overset{\text{Veratridine.}}{(C_{32}H_{49}NO_2)_2} + \overset{\text{Water.}}{(H_2O)_2} = \overset{\text{Veratric Acid.}}{C_9H_{10}O_4} + \overset{\text{Veratroine.}}{C_{55}H_{92}N_2O_{16}}$.

"Three days afterward the same dose was again given to the same dog, with very similar results. With this animal, the pulse was not much depressed, the prostration was very great, and there was almost total loss of power of the voluntary muscles.

"During the months of July and August, 1857, I tried thirty-one experiments upon dogs with the alkaloid, made by myself from veratrum viride, and with the commercial veratria made by Merck, for the purpose of ascertaining if they were alike in their therapeutic action.

"From these experiments I learned that the alkaloid from the viride was more sedative in its effects upon the pulse than the commercial veratria; that it was less irritant, seldom causing an increase in the number of pulsations, which the commercial veratria frequently did; that it produced vomiting and prostration in about an equal degree; that when a large dose was given, and prostration induced, there was most generally a dilatation of the pupils, but this effect was not produced by small doses; that purging was but seldom produced by either when given by the mouth, but nearly always when given by hypodermic injection; that large doses of either, amounting to two grains at a time, might be given, producing alarming prostration, and most painful and protracted vomiting, without causing death, if brandy, brandy and morphia, or tincture of cantharides was administered; and that in every instance the animal's life might be saved by proper attention.

"In those instances where death took place from these alkaloids, it was caused by repeating the dose, and not by a dose of two grains administered at one time. Upon post-mortem examination, the mucous membrane of the stomach was much inflamed, and in some instances the inflammation extended more or less through the whole intestinal tract, and was always seen at the rectum; the kidneys were in a state of congestion, and the heart filled with dark blood.

"Both alkaloids produced a sedative effect upon the pulse, but the commercial veratria did not to the same extent as that from the viride, and neither of them to the same extent as the pure resinoid, or the tincture made from veratrum viride.

"The prostration was more complete, alarming, and prolonged, and the vomiting was more painful and continued from the effects of the alkaloid than from the other preparations named."

Dr. Percy's experiments upon frogs, meanwhile watching their circulation with the aid of a microscope, are very interesting. After the injection of the tincture, the course of the blood through the capillaries "may be watched until the circulation is so regular and sluggish that the blood-globules may be counted as they course through the smaller vessels, and the difference between the white and red disks, and their position in the larger capillaries, may be easily discerned. Sometimes the circulation would almost entirely cease in the web, but would return again in ten or fifteen minutes if the frog upon the plate was placed in fresh running water.

"It was always interesting to watch the cessation of the circulation and its recommencement.

"When large doses of the veratrum viride were given by the stomach, the cessation of the circulation never occurred suddenly. There would be intermissions of longer or shorter duration; after each one, the current of blood when re-established would be slower than before, and after a while would cease. After it had ceased there would be an occasional throb, which would cause a general movement, but upon the subsidence of the impetus, the blood-disks would be in about the same situation as before.

"The occurrence of this throb was the first notice given of the return of the circulation; it would be repeated at shorter intervals, sometimes a minute elapsing, and then several of such pulsations would occur in a minute. Then a short but general movement would take place of the blood-disks, at each pulsation, ceasing upon cessation of the *vis a tergo*, and again renewed, until the circulation was entirely established in a slow but steady current."

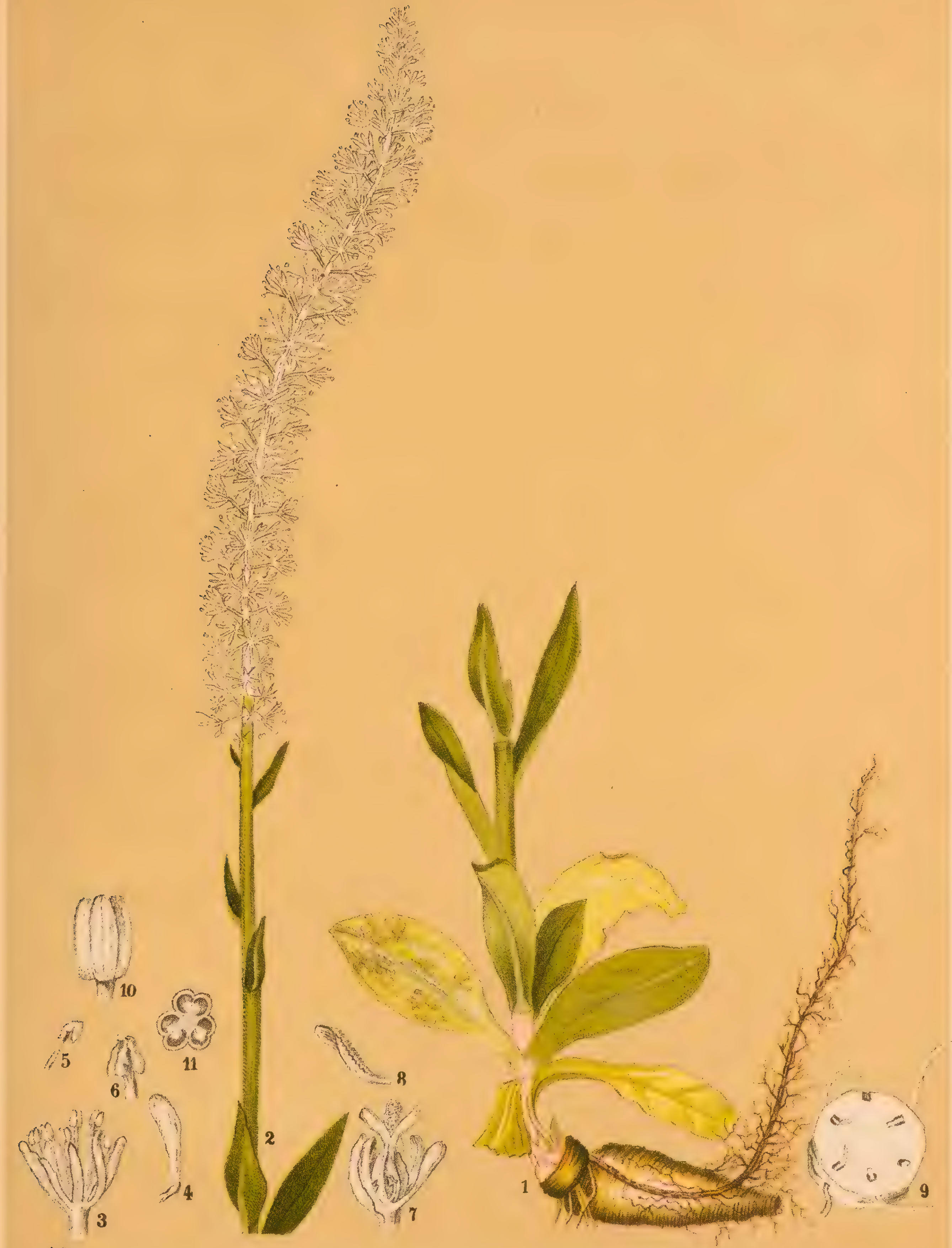
On Man.—Veratrum viride causes slight or temporary delirium; vertigo, especially when in an erect position; dimness and unsteadiness of vision, which compels a horizontal position; dry mouth and lips; tongue coated at base and sides, with a red streak down the centre; dryness of the throat and numbness of the fauces; excessive and painful singultus, profuse salivation, with severe spasms of the superior portion of the œsophagus, and great nausea, vomiting and cold sweat; vomit composed of mucus, bile, and dark-colored blood; pain and soreness of the lower abdomen; urine clear and scant; convulsive, suffocating breathing; pulse slow, weak, small, and soft, reduced even to almost imperceptibility; very profound prostration, the patient is unable to rise or to walk; profuse cold sweat, with chills and coldness of the surface of the body.

The action, then, is that of an arterial and nerve sedative; it paralyzes both the voluntary and involuntary muscles; it increases all secretions through its influence in paralyzing the vaso-motor system of nerves, allowing thus a great dilation of the capillaries.

Description of Plate 176.

1. Whole plant, 6 times reduced, Binghamton, N. Y., July 7th, 1885.
2. A small raceme, from the lower portion of the panicle.
3. Under surface of flower, showing bract.
4. Sepal.
5. Stamens.
6. Pistil.
7. Longitudinal section of ovary.
8. Horizontal section of ovary.

(3–8 enlarged.)



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CHAMÆLÌRIUM LÙTEUM, Gray.

N. ORD.—LILIACEÆ.

Tribe.—MELANTHIEÆ.

GENUS.—**CHAMAELIRIUM**,[*] WILLD.

SEX. SYST.—HEXANDRIA TRIGYNIA.

HELONIAS.[†]

DEVIL'S BIT.

SYN.—CHAMAELIRIUM LUTEUM, GRAY; C. CAROLINIANUM, WILLD.; HELONIAS DIOICA, PURSH.; H. PUMILA, JACQ.; H. LUTEA, AIT.; VERATRUM LUTEUM, LINN.; MELANTHIUM DIOICUM, WALT.; M. DENSUM, LAM.; OPHIOSTACHYS VIRGINICA, DEL.; ABALON ALBIFLORUM, RAF.

COM. NAMES.—DEVIL'S BIT, BLAZING STAR, UNICORN PLANT, DROOPING STARWORT, FALSE UNICORN ROOT, STARWORT, COLIC ROOT.[‡]

A TINCTURE OF THE ROOT OF CHAMAELIRIUM LUTEUM, GRAY.

Description.—This smooth perennial herb attains a growth of from 1 to 3 feet. *Stem* wand-like, leafy. *Rootstock* thick, abrupt, light colored, and furnished with many long roots from the base of the stem, and a number of fibrous rootlets from its thickest portion. *Leaves* alternate, parallel veined, those of the upper stem small, lanceolate, and sessile, increasing in size toward the root, where they tend toward spatulate and are tapered into a petiole. *Inflorescence* diœcious, both kinds in long, terminal, virgate, spike-like racemes, the fertile nearly erect, the sterile more or less curved; *pedicels* spreading in the male, erect in the female, all bractless. *Perianth* in both sexes composed of 6, spatulate, spreading, marcescent sepals. *Stamens* 6, unequal, longer than the sepals in the male flower, short and rudimentary in the female; *filaments* thread-shaped; *anthers* yellow, 2-celled, roundish oval, and extrorse. *Ovary* green, usually wanting in the sterile flowers; *styles* 3, linear-clavate, spreading, separate down to, and nearly as long as, the ovary; *stigmas* simply the inner surfaces of the styles. *Fruit* an ovoid-oblong, 3-celled pod, loculicidally 3-valved from the apex. *Seeds* numerous, linear-oblong, winged at each end.

History and Habitat.—The Devil's Bit is indigenous to North America, where it ranges from Western New England westward to Illinois and southward; it habits rich woods, and flowers in June.

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[*] χαμαί, *chamai*, on the ground; λειριον, *leirion*, lily.

[†] Ἕλος, *helos*, marsh; as some species frequent bogs.

[‡] For analysis of the common names, see foot-note and history, under Aletris, 172.

On account more of the similarity of vulgarisms than aught else, this plant and Aletris are gathered as the same in various localities, or are interchanged. The root of Helonias, however, is too characteristic, even when thoroughly dried, to be mistaken for that of any other plant known to me. When this root is cut across it will be plainly noticeable that the fibrous rootlets pierce the cortex through ample foramina, in which they are found to be freely movable, like a thread in the eye of a needle (Fig. 9); this character is constant and specific. It is said that there is an aboriginal legend to the effect that the bad spirit, angered that this root should cure all disorders—as was then supposed—bit off a portion of it to curtail its usefulness, whence the name Devil's Bit.

The previous medical history of this plant dates from the aboriginal use against colic, worms, and fevers. In domestic and botanic practice it is considered tonic, diuretic, emetic, sialagogue, emmenagogue, vermifuge, and antiscorbutic. Rafinesque says that its mere application to the skin causes diuresis. Dr. B. S. Barton thought that its relief of colic was on account of some narcotic power. Dr. Ives used it as a tonic, and commends it for checking nausea and vomiting. Dr. Braman[*] had the utmost confidence in the root in the cure of leucorrhœa. The Indian squaws employed the root to check miscarriages, and chewed the root to relieve coughs. Helonias proves itself very useful in atony of the generative organs of both sexes, especially when associated with colic and severe lumbar pains.

PART USED AND PREPARATION.—The fresh root, gathered after the fruits have bursted, is treated as directed under Trillium.[†] The resulting tincture has a beautiful, clear orange color by transmitted light; no distinguishing odor; a pleasant, but very bitter, taste; and an acid reaction.

CHEMICAL CONSTITUENTS.—*Chamælirin.* Dr. Green succeeded in isolating this glucoside from the root, and suggests the name. Like many principles of the lily tribe, this body is saponaceous in its alcoholic and aqueous solutions, and insoluble in other general solvents. He describes the body as an amorphous, neutral, bitter powder, splitting, through the agency of dilute acids, into glucose and an uninvestigated body that is insoluble.

The Tildens' analysis[‡] resulted in the determination of an oleo-resin, a bitter principle, extractive, gum, starch, and other bodies not essential.

PHYSIOLOGICAL ACTION.—The symptoms caused in several experimenters from the ingestion of varying doses of the tincture and of *helonin*, are in substance as follows: Mental depression; headache, fulness, and vertigo; dimness of vision; dryness of the mouth and fauces; irritation and burning of the stomach; colic; slight purging followed by scyballa; burning in the region of the kidneys "like two bags of hot water;" profuse urination followed by uncertainty of the sphincter vesicæ; uterine hemorrhage, and burning of the pudenda; lowering of the frequency of the pulse; severe lumbar pain; languor, chilliness, and flashes of heat.*

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[*] *Bost. Med. and Surg. Jour.*, xl, 416.

[†] Page 175-5.

[‡] *Jour. Mat. Med.*, N. S., ii, 122.

DESCRIPTION OF PLATE 177.

1 and 2. Whole male plant, Port Crane, N. Y., June 29th, 1885.
3. A male flower.
4. Sepal.
5. Stamen.
6. Anther.
7. Female flower.
8. A style.
9. Horizontal section of the rootstalk.
10. Fruit.
11. Horizontal section of the fruit.
(3–8 and 10–11 enlarged.)

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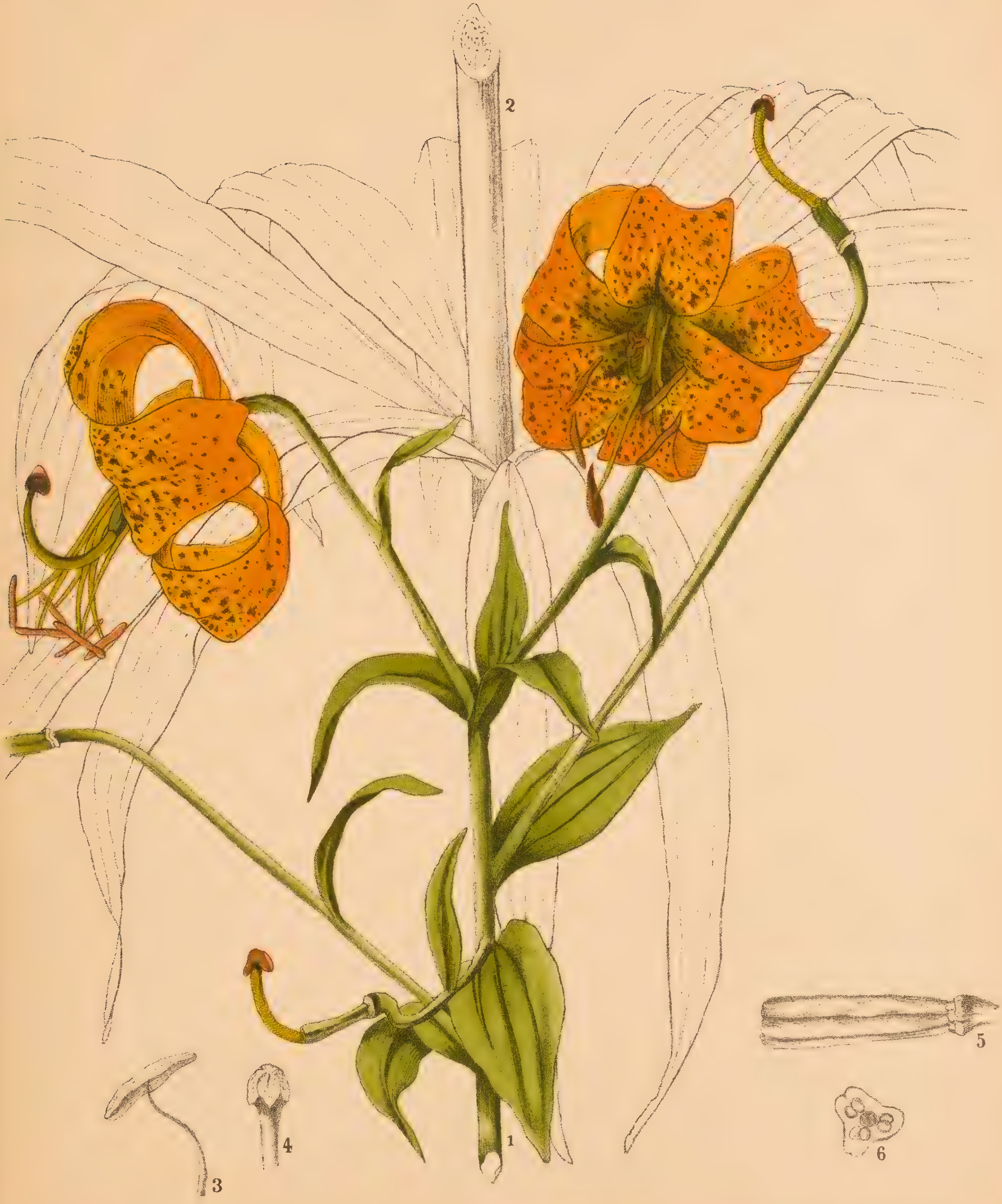
* Allen, *Ency. Mat. Med.*, iv, 565–72; mostly from Dr. Samuel A. Jones' experiments.



CF.M. ad nat del. et pinxt.

LÍLIUM SUPÉRBUM, Linn.

N. ORD.—LILIACEÆ.

Tribe.—LILIEÆ.

GENUS.—**LILIUM**,* LINN.

SEX. SYST.—HEXANDRIA MONOGYNIA.

LILIUM SUPERBUM.

TURK'S-CAP LILY.

SYN.—LILIUM SUPERBUM, LINN.; L. CAROLINIANUM, MICHX. (?)
COM. NAMES.—TURK'S-CAP LILY, SUPERB LILY, MEADOW LILY, WILD TIGER LILY.

A TINCTURE OF THE FRESH BULB OF LILIUM SUPERBUM, LINN.

Description.—This beautiful perennial herb attains a growth of from 3 to 7 feet. *Bulb* scaly; *stems* simple, erect, glabrous, rounded. *Leaves* sessile, the lower in whorls of from 5 to 7, the upper scattered, all 3-nerved, lanceolate, pointed, and smooth. *Inflorescence* a terminal pyramidal raceme; *flowers* 3 to 40, nodding; *perianth* open campanulate, its divisions somewhat coherent at their bases. *Sepals* 6, sessile, strongly revolute, deciduous, bright orange with numerous dark purple spots inside, and a honey-bearing furrow at the base. *Stamens* 6, shorter than the style, hypogynous; *filaments* dilated and somewhat adherent at their bases, from which they taper to a very fine apex at the point of fixture of the anther; *anthers* linear, versatile, at first included then projecting, opening by a lateral or slightly introrse line. *Ovary* 3-celled; *ovules* anatropous. *Style* elongated club-shaped; *stigma* apical, 3-lobed, the receptive surface velvety. *Fruit* an oblong, subtriangular, 3-celled, loculicidal capsule, each cell containing two rows of seeds. *Seeds* numerous, horizontally flattened by compression; *testa* soft; *embryo* small, axial; *albumen* fleshy.

History and Habitat.—This beautiful lily is indigenous to North America from the Carolinas northward to Canada and westward to the Rocky Mountains, where it habits rich low grounds, and flowers from June through July.

This species has no medical history, its congener, *L. tigrinum*, of China, covering all that is known concerning this.

PART USED AND PREPARATION.—The fresh bulbs are treated in the same manner as those of Trillium (p. 175-5). The resulting tincture has a beautiful orange color by transmitted light; no distinguishing odor; a bitter and astringent taste, and an acid reaction.

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* The classical Latin name, from the Celtic *li*, or the Greek λειριον, *leirion*, white.

In preparing the tincture in further provings, the flowers, when in full sexual power, should be included, thus extending its therapeutic usefulness.

PHYSIOLOGICAL ACTION.—The only account of the action of this drug is that of Dr. E. Reading,* who records the following effects: Mental exhaustion; headache; dullness of the eye; epistaxis; paleness and sickly expression of countenance; bitter taste in the mouth; burning of the mouth and œsophagus; increased appetite; splenic discomfort; constipation; oppression of chest; acceleration of the pulses; weakness of the extremities; languor; debility, prostration, and restlessness.

DESCRIPTION OF PLATE 178.

1. Upper portion of flowering plant, Elmira, N. Y., Aug. 11th, 1885.
2. Section of mid-stem.
3. Stamen.
4. Stigma.
5. Young fruit.
6. Section of ovary.

(3, 4, and 6 enlarged.)

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* Allen, *Encyc. Mat. Med.*, X, 572.

PLATES 179 AND 180.

SERIES

CRYPTOGAMIA.

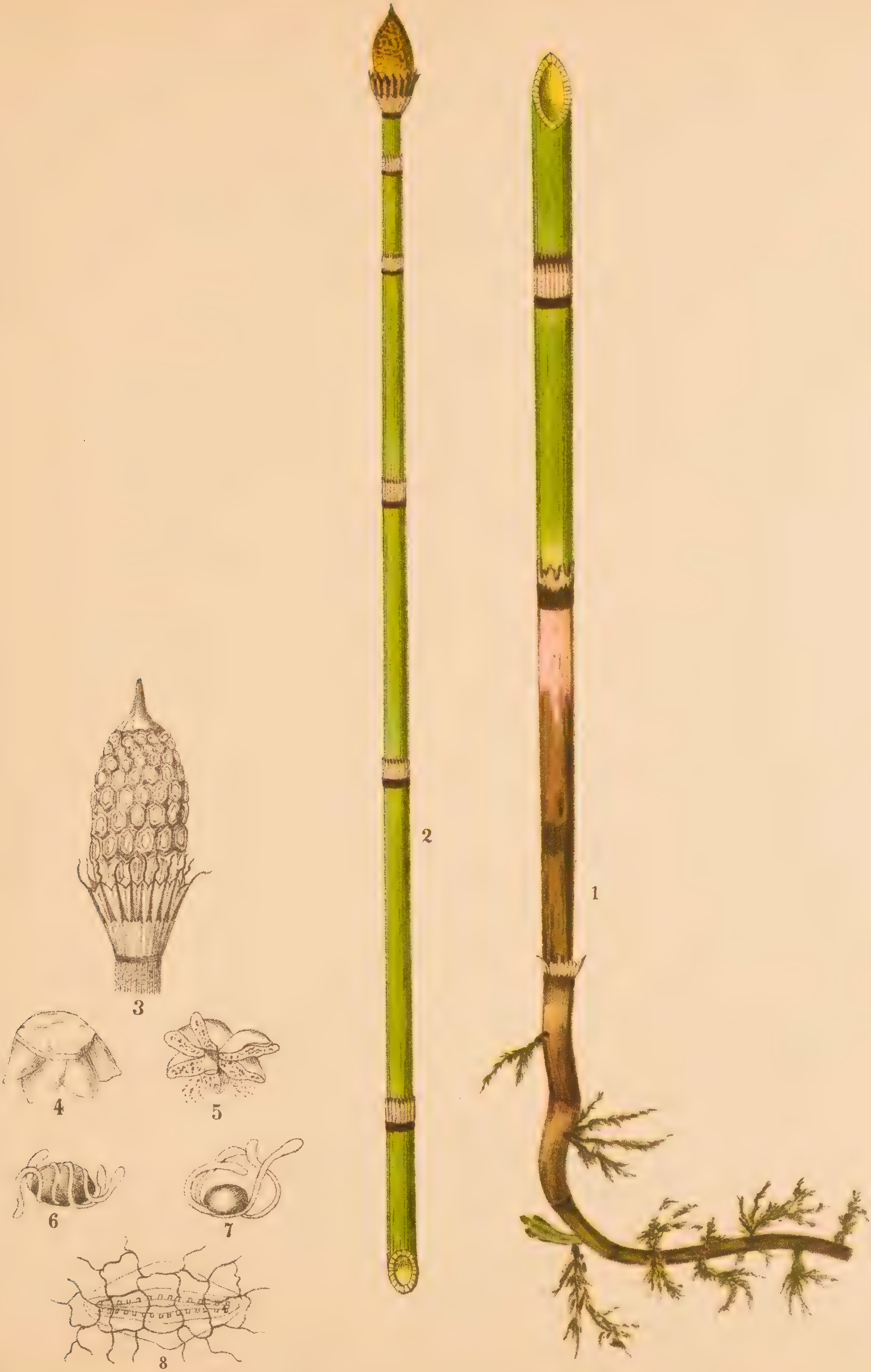
Plants without flowers; *i. e.* destitute of the essential organs stamens and pistils, and producing in lieu of seeds, numerous microscopic bodies capable of germination, called spores.

CLASS

ACROGENS.

Cryptogams with distinct stems and branches, exhibiting woody tissue and vessels, and generally with some sort of foliage.

[To precede plate 179.]



F.M. ad nat del. et pinxt.

EQUISÈTUM HYEMÀLE, Linn.

GENUS.—**EQUISETUM**,* LINN.

SEX. SYST.—CRYPTOGAMIA FILICES.

EQUISETUM.

GREAT SCOURING RUSH.

SYN.—EQUISETUM HYEMALE, LINN.

COM. NAMES.—SCOURING RUSH, DUTCH RUSH, SCRUBBING RUSH, SHAVE-GRASS, WINTER HORSETAIL; (FR.) PRÊLE; (GER.) SCHACHTELHALM.

A TINCTURE OF THE WHOLE FRESH PLANT EQUISETUM HYEMALE, LINN.

Description.—This erect, arrow-like plant grows to a height of from 1 to 3 or 4 feet. *Root* perennial, horizontal, jointed like the stem, putting off from the sections, at their middle, numerous moss-like rootlets. *Stem* simple, rarely inconspicuously branched, sub-cylindrical from root to spike, hollow, evergreen, surviving the winter; *ridges* 17 to 27, very rough; *tubercles* in two more or less distinct lines on the ridges, constituting the roughness of the stem. *Sheaths* elongated, closely appressed to the stem at each joint, and furnished with a black zone at their bases; *limb* black, composed of as many teeth as there are ridges upon the stems; *teeth* linnear, narrow, each with a keel at its base, appearing as a prolongation of the ridge below; the awned points deciduous. *Epidermis* abounding in silex; *stomata* disposed in two lines, one on each side of the groove. *Spike* apical, ovate, armed with a sharp, rigid, black tip; *scales* with a dark, brownish-black face.

Equisetaceæ and Equisetum.—This family of flowerless plants is very characteristically distinct, consisting of one genus only, the *Equiseta*, immediately recognized after once examined. They consist of fertile and sterile stems, often branched, and always jointed, hollow, and rough. The root, in its solid portion, is composed from centre to circumference of the following layers: strong cellular tissue; a circle of air-canals, each surrounded by a zone of vascular bundles; a circle of vascular bundles composed of annular ducts; a parenchyma traversed by air-canals; a circlet of parenchymatous cells; and the cuticle. As the rhizome approaches the stems it becomes hollow through the loss of the central cellular tissue and the modification of the other layers. The jointed *stems* and *branches* are hollow and bridged by a thin membranous diaphragm at each joint. The

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* *Equus*, a horse; *seta*, a hair or bristle.

fruiting head is somewhat cone-shaped, composed of a central axis as a prolongation of the last joint of the stem, upon which are situated, like growing toad-stools, numerous groups of *thecæ* or *sporanges*, joined by their bases to a central axis, and looking inward, so that only the somewhat hexagonal flattened cap is seen externally. These sporanges, as they ripen, separate from one another, and finally burst longitudinally, allowing the escape of the spores. The *spores* are very strange bodies, unlike any other form of vegetable matter. They are ovoid in shape, and composed of two coats, the outer splitting spirally, thus forming four thread-like bodies, thicker at their free ends, called *elaters*, which, from what follows, will be seen to be very useful in scattering the seed. While the spores are crowded in the sporangia, or when they are damp, these elaters are tightly coiled around the spore; but, as soon as the theca bursts, or the spores become dry, the elaters uncoil with force, causing the propulsion of the spore to quite an extent. This may be seen by placing a few spores under the microscope and breathing upon them; the exhaled moisture causes the elaters to coil up immediately; by quickly placing the eye at the tube a curious sight is witnessed as drying commences. If the drying is slow, the spores roll and twist about like spiders in pain; while, if the drying is quick, they will skip from the field of view like grasshoppers. The *germination* of the spore is quite similar to the process of multiplication in the rod-bacteria. A bud-like process puts out from the spore and soon becomes cut by a septum; this grows on and multiplies in all directions until a tuft is formed, from the centre of which arises *archegonia* and *antheridia*, in distinct bodies. After fertilization of an archegonium, the germ-cell developes like an embryo. At the present day the Equiseta are all comprised in one genus, but paleontology shows many species of great size and more varied features.

History and Habitat.—The Scouring Rush grows on wet banks, in open woods, especially northward, fruiting in early spring. From the abundance of silex in the cuticle, the stems have been variously used for scouring purposes; this use has contributed largely to its vocabulary of vulgarisms. It is gathered into bundles by many housewives and used to brighten tins, floors, and woodenware, and in the arts for polishing woods and metals. Rafinesque says: "This plant, and allied species, furnish good food for cattle in winter." He speaks of a tall species, called *Nebratah* by the Missouri Indians, used in the manufacture of mats, and of a species which he names *E. tuberosum*, the roots of which are used as food by the Indians.

This plant is not mentioned in the U. S. Ph., and not officinal in the Eclectic Materia Medica.

PART USED AND PREPARATION.—The whole fresh plant is chopped and pounded to a pulp and weighed. Then two parts by weight of alcohol are taken, the pulp mixed well with one-sixth part of it, and the rest of the alcohol added. After thorough mixture the whole is poured into a well-stoppered bottle and allowed to stand eight days in a dark, cool place. The tincture thus formed, after straining and filtering, should have a light greenish-brown color by transmitted light, a woody taste, followed by a slight tobacco-like burning of the tongue, and an acid reaction to litmus-paper.

CHEMICAL CONSTITUENTS, Silicia, SiO_2.—This oxide of silicium is present in the plant in large quantities, ranging, according to different authorities, from 7.5 to 41.2 per cent. of the whole herb.

Equisetic Acid, Aconitic Acid, $C_6H_6O_6$.—This acid was determined in *E. fluviatile* as magnesium aconitate by Braconnot, who considers it present in the other species of the genus. It forms in highly acid klinorhombic prisms, fusing at about 130° (266° F.), and soluble in both water and alcohol. This acid has also been called "mallic," because it is formed upon the destructive distillation of mallic acid; but it fails to answer to the properties of that acid, as well as to its composition, $C_4H_4O_4$.

PHYSIOLOGICAL ACTION.—Dr. Hugh M. Smith states* the following symptoms arising in persons taking from 50 to 150 drops of the tincture: Greatly increased appetite; severe sharp pain, with soreness, in the lower abdomen; pain, tenderness, and distention of the bladder, with frequent urging to urinate; sharp pain along the urethra, burning and aching in the penis and testicles when urinating, with soreness of the testicles and spermatic cord; dull pain and soreness in the back, with prostration.

It is said that where cattle have been given too large quantities of an infusion as a diuretic, it has caused the voidance of blood.

Description of Plate 179.

1. Lower portion of stem.
2. Upper portion of stem.
(Two feet of stem between Nos. 1 and 2 left out.)
3. Fruiting head (enlarged.)
4. Sporangia, outer; 5. inner view.
6. Damp spore x 200.
7. Dry spore x 200.
8. Stoma x 200.
From Binghamton, N. Y., May 1, 1884.

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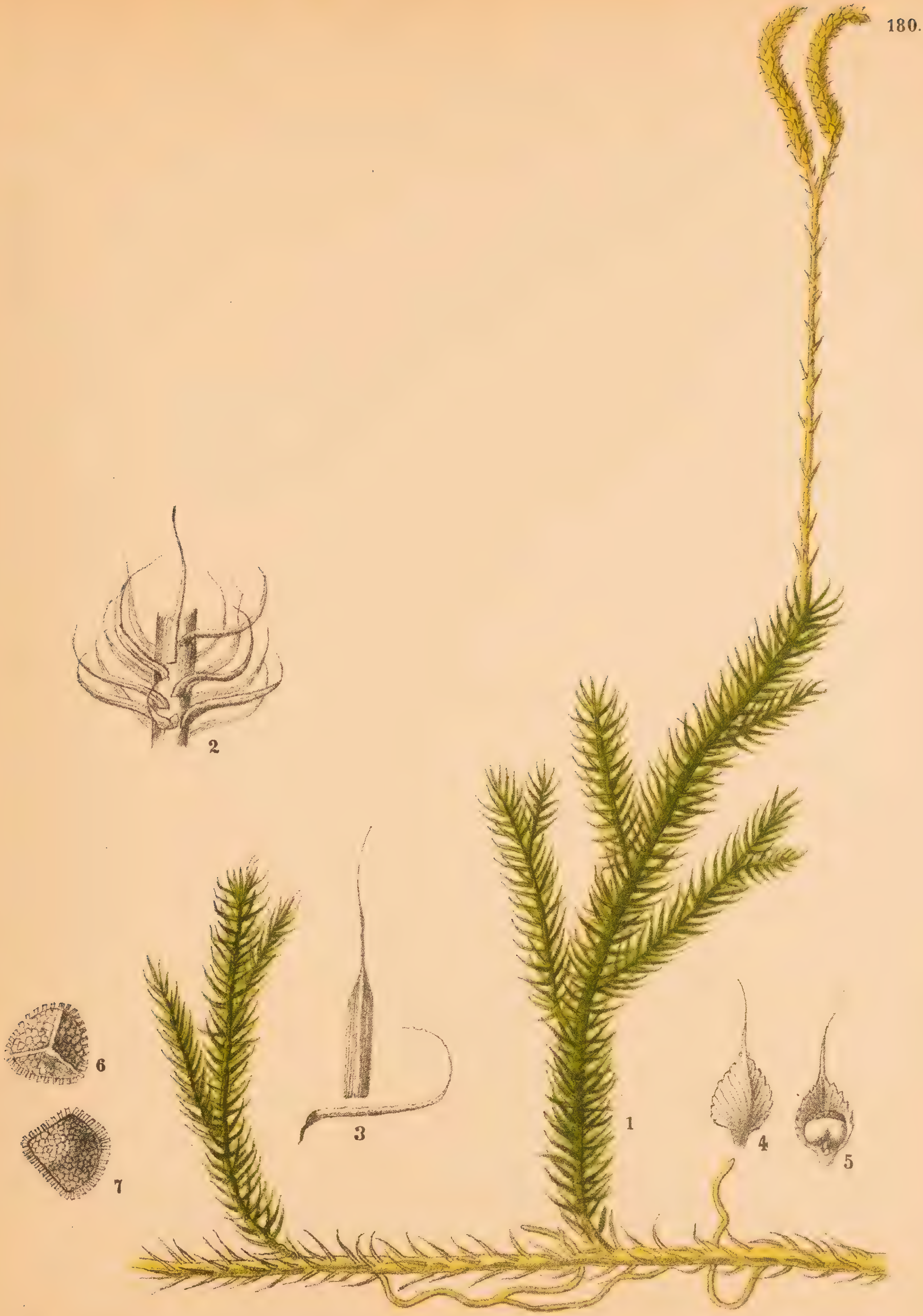
* *Thesis*, N. Y. Hom. Med. Coll., 1876; Allen, *Ency. Pure Mat. Med.*, vol. iv., pp. 204–210.



Cm. ad nat. del. et pinxt.

LYCOPÒDIUM CLAVÀTUM, Linn.

N. ORD.—LYCOPODIACEÆ.

GENUS.—**LYCOPODIUM**,[*] LINN.

SEX. SYST.—CRYPTOGAMIA LYCOPODINEÆ.

LYCOPODIUM.

CLUB MOSS.

SYN.—LYCOPODIUM CLAVATUM, LINN.; L. TRISTACHYUM, PERS.; L. INTEGRIFOLIUM, HOOK.

COM. NAMES.—COMMON CLUB MOSS, GROUND PINE, HOG'S BED, SNAKE MOSS, STAG'S HORN, WOLF'S CLAW; (FR.) PIED DE LOUP; (GER.) KALBEN-MOOS, GEMEINES BÜRLAPP. THE SPORES: VEGETABLE SULPHUR; (FR.) LYCOPODE, SOUFRE VÉGÉTAL; (GER.) BÜRLAPP-SAMEN, BLITZ PULVER, WURM MEHL, HEXEN MEHL.

A TRITURATION OF THE SPORES OF LYCOPODIUM CLAVATUM, LINN.

Description.—This evergreen perennial extends to a length of 30 feet or more. *Stem* tough, flexible, terete, and very leafy, creeping extensively and striking root at varied intervals; *roots* light yellow, wiry, solitary and straight; *branches* ascending, similar to the stems, but short and subdivided, the fertile terminated by a fruiting peduncle. *Leaves* crowded, homogeneous, equal and many-ranked, all linear-awl-shaped, incurved, spreading, light green, and tipped by a long, incurved capillaceous bristle. *Peduncle* of the female branches erect, strict, 4 to 6 inches long, and bearing from 1 to 4, but usually 2, spikes; *bracts* sparse, somewhat appressed, tipped with a fine bristle; *spikes* linear, cylindrical, blunt, erect, mostly in pairs, each composed of an axis and many closely appressed scales; *scales* ovate-triangular, closely imbricated, membranaceous, erosely denticulate, pedicelled and tipped by a filiform point. *Spore-cases* (*theca*) all of one kind, situated in the axils of the scales, all more or less flattened-reniform, coriaceous, 1-celled, and opening by a trans-marginal line down through even the pedicel, leaving each valve an individual stalk. *Spores* copious, very minute, together forming a very mobile, sulphur-yellow powder, which is described further on.

Lycopodiaceæ.—This family of low, moss-like plants, is represented in North America by 2 genera and 13 species; its general characteristics are: *stems* herbaceous or ligneous, simple or branched, and usually prostrate and extensively creeping. *Leaves* usually crowded, linear, simple, sessile, persistent, 1-nerved, and more or less appressed. *Fructification* axillary or spiked; *spore cases* quite large, 2-valved; *spores* generally copious and minute.

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[*] Λύκος, *lykos*, a wolf; ποῦς, ποδος, *pous*, *podos*, a foot; from a fancied resemblance.

This peculiar order furnishes but few drugs, but, contrary to their general appearance, they have high medicinal qualities. The West Indian *Lycopodium cernuum*, Linn., is diuretic, and recommended as a specific for certain forms of dysentery; the Peruvian *L. catharticum*, Hook., is a violent purgative, valued by the natives in leprosy and elephantiasis; the East Indian *L. phlegmaria*, and *L. hygrometricum*, L., are considered aphrodisiac, especially the latter, which is noted for its qualities in this direction; and the European and American *L. Selago*, Linn., an active, narcotic poison; emetic and cathartic in small doses, but dangerous in large, bringing on violent purgation and convulsions; it is also strongly counter-irritant when applied to the skin, being used to keep blisters open, and to kill lice upon animals.

History and Habitat.—The common Club Moss is indigenous to North America, Northern Europe and Asia, as well as like countries of the Southern Hemisphere. It occurs in this country in dry woods, where it is common northward, fruiting in July and August.

Under the names *Muscus terrestris*, or *Muscus clavatus*, this plant was used as a whole, by ancient physicians, as a stomachic and diuretic, though the powder does not appear to be used alone, until about the 17th century. *L. Selago* was employed, by the Druids, as an active cathartic and deobstruent.

The spores have been used as a diuretic in dropsy; a drastic in diarrhœa, dysentery, and suppressions; a nervine in spasms and hydrophobia; an aperient in gout and scurvy; and a corroborant in rheumatism. Externally they are largely used as a dusting powder for various skin diseases, and in excoriations of infants, to prevent chafing; and are considered the most efficacious application to *plica polonica*. In pharmacy, they form the best powder for keeping pills and lozenges from cohering with each other. They are very inflammable, so much so as to flash with a hissing noise when ignited. This property has determined their use in pyrotechnics, and for imitating the lightning's flash in theatrical performances.

The spores are officinal in the U. S. Ph.; in the Eclectic Dispensatory the plant is not mentioned.

PART USED AND PREPARATION.—The *spores, en masse*, form a very fine, odorless, tasteless, mobile, light-yellow powder, adhering to the fingers, but exhibiting a repulsive force for water. If shaken with water a portion sinks, with alcohol it is readily miscible; it is tinged brown by iodine; and sulphuric acid, when hot, instantly penetrates the spores, rendering them transparent, but not rupturing their coat. *Individually*, under a strong lens, the spores are seen to be bluntly tetrahedral, one surface (the base) being convex, the others triangularly pyramidal, their apices not fully meeting, but leaving a three-armed space. They show a surface finely reticulated by minute ridges, that are more elevated at their junctions, and enclose pent- or hexagonal spaces, the floors of which are occupied by a transparent, but astonishingly tough membrane, which, when ruptured, allows the escape of globules of an oily nature.

Sophistication.—The pollen of some plants, such as the cat-tail (*Typha latifolia*); pine (various species of *Pinus*); spruce (*Abies*), and hemlock (*Abies Canadensis*), are often mixed fraudulently with the powder, the microscope alone being able to detect the imposition.[*] Starch, when incorporated with the powder, may be detected by iodine; and talc, gypsum, and chalk may be discovered by throwing the powder into water, or bisulphide of carbon; boxwood powder may be separated by the use of a fine sieve that will allow the spores to pass and retain the wood. However, the Lycopodium of commerce, which is mostly gathered in Russia, Germany, and Switzerland, is usually quite pure.

To obtain an efficacious tincture of Lycopodium, a previous severe trituration for hours, first dry and then with the addition of sufficient alcohol to form a paste, is necessary; then five parts, by weight, of alcohol is added, the whole poured into a well-stoppered bottle, and allowed to stand for eight days in a dark, cool place, being thoroughly shaken twice a day. The tincture, separated by straining and filtering, has a clear straw-color by transmitted light; an oily odor and taste; and a neutral reaction.

CHEMICAL CONSTITUENTS.—Analyses made by Buchholtz and Cadet determined the presence of fat oil 6.0, sugar 3.0, gum 1.5, pollenin 89.5, this last being a mixed body. Stenhouse determined the presence of volatile bases, which were corroborated by Flückiger, who also determined that the ash was not alkaline, and contained alumina and phosphoric acid.

Oil of Lycopodium.—This bland liquid, of which Buchholtz found only 6 per cent., was determined by Flückiger to exist in large amount (47.0 per cent.) when the spores are ruptured. It does not solidify, even at — 15° (+ 5° F.).

[*Lycopodine*, $C_{32}H_{52}N_2O_3$.—This alkaloid, isolated by K. Boedecker[†] from an aqueous solution of the alcoholic extract of *L. complanatum*, Linn., may prove to exist also in this species. He describes it as a bitter, crystalline body, melting at 114° (237.2° F.), and freely soluble in many liquids, including alcohol and water.][‡]

PHYSIOLOGICAL ACTION.—The experiments with this drug by Dr. Arnold, of Heidelberg, with the tincture, and by Prof. Martin, of Jena, and six of his pupils, gave the following: The general symptoms were those of excitement, quickened circulation, headache, increased appetite, more frequent evacuations, and stronger sexual desire. The chief local affinity manifested was for the urinary organs. There was frequent and sometimes painful micturition; and the urine was cloudy and sedimentous, occasionally charged with mucus and even blood. This mostly covers the so-called physiological action, though, when long-continued doses of the more highly potentized drug are taken, the scope of this remedy is immeasurably enlarged.[§]

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[*] See Fig. 11, Plate 163, and Fig. 9, Plate 164.

[†] *Ann. de Chim.*, 208, 363.

[‡] *Am. Jour. Phar.*, 1882, 77.

[§] Consult *Allen's Encyclopædia of Pure Materia Medica*, vol. 6, pp. 1–69.

180-4

Description of Plate 180.

1. A portion of a stem after fruition, from Wenham, Mass., Nov. 23d, 1886.
2. A section of a stem.
3. Leaf.
4. A bract, outer view.
5. A bract, inner view, showing theca.

6 and 7. Two views of a spore × 250.

(2–5 enlarged.)

APPENDIX.

GLOSSARY.

A, when beginning a Greek derivative, signifies a want of something, or a negative (*a*caulescent—without a stem).

Abnormal, contrary to the usual order of things.

Aboriginal, truly original.

Aborigine, in this work means the American Indian.

Abortion, an imperfect formation, or the non-formation, of some part.

Abortive, imperfect or rudimentary (the stamen, plate 113, fig. 5).

Abrupt, suddenly terminating; as

Abruptly pinnate, without an odd leaflet at the end. (Plate 35, fig. 10.)

Acaulescent, apparently stemless. (Plate 19, fig. 1.)

Accumbent, lying against a thing.

Acetabuliform, saucer-shaped.

Achenium, pl. *achenia*, a one-seeded, seed-like fruit. (Plate 95, fig. 6.)

Achlamydeous, without floral envelopes.

Acicular, needle-shaped.

Acinaciform, scimitar-shaped.

Acrogenous, growing from the apex. (Plate 179, fig. 2.)

Acrogens, or *acrogenous plants*, the higher cryptogamous plants.

Aculeate, armed with prickles. (Plate 33, fig. 1.)

Aculeolate, slightly prickly (the stem of fig. 1, plate 155).

Acuminate, taper-pointed (the leaves of fig. 6, plate 152).

Acute, merely sharp pointed (the leaves of fig. 8, plate 156).

Adelphous, said of stamens when joined in a fraternity.

Adherent, sticking to, or growing fast to, another body (calyx to ovary, fig. 3, plate 70).

Adnate, said of an anther when fixed by its whole length to the filament. (Plate 80, fig. 8.)

Adventitious, out of the usual place.

Adventive, said of foreign plants when sparingly introduced—not really naturalized.

Æquilateral, equal sided.

Æstivation, the arrangement of the parts in the flower bud.

Akenium, or *akene*. See *achenium.*

Ala, pl. *alæ*, a wing; the side petals of a papilionaceous corolla. (Plate 46, fig. 3, *b*.)

Alate, winged; as the seeds of the ash. (Plate 137, fig. 4.)

Albumen, a vegetable product stored with the embryo in the seed. (Plate 142, fig. 4.)

Albuminous, furnished with albumen.

Alexipharmic, that which obviates the effects of a poison.

Alexiteric, something that thwarts the action of venom.

Alternate, said of leaves when arranged one after the other. (Plate 81, fig. 1.)

Ament, a catkin. (Plate 156, fig. 1.)

Amorphous, without definite form.

Amphitropous, an ovule attached by the middle of one side, *i. e.* the raphe truly lateral. (Plate 9, fig. 4.)

Amplectant, embracing.

Amplexicaul, clasping the stem by the base (as the leaves of fig. 2, plate 68).
Amylaceous, starchy.
Anastomosing, forming a net-work, like the veins in a leaf.
Anatropous, an ovule bent back upon its stem. (Plate 22, fig. 6.)
Ancipital, two-edged (as the petioles, fig. 5, plate 162).
Andrœcium, the stamens collectively.
Androgynous, having both male and female flowers in the same cluster.
Angiospermous, plants with their seeds formed in an ovary.
Annual, said of a plant that flowers and fruits the year it is raised from the seed, then dies.
Annular, in the form of a ring.
Annulate, marked by rings. (Plate 139, fig. 3.)
Anther, the essential part of a stamen, which contains the pollen. (Plate 152, fig. 4.)
Antheriferous, having an anther. (Plate 113, stamen 4, in contradistinction to stamen 5.)
Anthesis, the act of expansion of a flower.
Anthrocarpous, multiple fruits, like the blackberry.
Apetalous, destitute of petals. (Plate 33, figs. 3 and 4.)
Apex, the terminal point of a body.
Aphyllous, destitute of leaves. (Plate 179, figs. 1 and 2.)
Apical, belonging to the apex.
Apiculate, tipped with an abrupt point. (Plate 5, fig. 5.)
Appendage, any superadded part (as seen on the sepals, plate 25, fig. 5).
Appendiculate, provided with appendages.
Appressed, brought into contact, but not united. (Plate 9, fig. 3.)
Aquatic, growing in water.
Arachnoid, cobwebby.
Arboreous, *arborescent*, tree-like, both in size and form.
Areola, the scar of attachment (seen on the root, plate 11, fig. 2).
Arillate, furnished with an
Aril, or *arillus*, a fleshy, false coat to a seed. (Plate 13, fig. 6.)
Aristate, see *Awned*.
Arrow-shaped, same as *Sagittate*, which see.
Articulated, furnished with joints.
Ascending, rising obliquely upwards.
Aspergilliform, shaped like the brush used to sprinkle holy water. (Plate 82, fig. 6.)
Assurgent, see *Ascending*.
Atropous, see *Orthotropous*.
Auriculate, ear-shaped (as the bases of the leaves, plate 138).
Awl-shaped, sharp pointed from a broader base. (Plate 1, fig. 5.)
Awn, a bristle-like appendage (as seen on anther, plate 100, fig. 7).
Axil, the angle on the upper side between a leaf and the stem.
Axile, belonging to the axis, or occupying the axis (the placenta in fig. 3, plate 70).
Axillary, occurring in an axil (the flowers of plate 130).
Axis, the central line of any body; the organ around which others are attached (as that portion of the stem occupied by the flowers, plate 172).

Baccate, berry-like (fruit of plate 124).
Barbate, bearded in lines, spots, or tufts (fig. 4, plate 122); not when the whole surface is hairy—then the part is truly bearded.
Barbellate, beset with short, stiff hairs, as is often the case with the pappus bristles in *Compositæ*. (Plate 92, fig. 6.)

Bark, the outside covering of a woody stem.
Basal, attached or belonging to the
Base, that end of a body that is attached to its support.
Beaked, surmounted by a long and narrow tip. (Plate 4, fig. 5.)
Bearded, covered with a growth of fine hairs. (Plate 1, fig. 8.)
Bell-shaped, see *Campanulate*.
Berry, a fruit that is juicy or pulpy throughout, as a grape.
Bi, or *Bis*, twice; as
Biauriculate, two-eared (the leaves of plate 138).
Bicipital, two-headed.
Biconjugate, twice paired (stigmas, fig. 5, plate 130).
Bidentate, two-toothed (as the ligule, fig. 5, plate 80).
Biennial, of two years' existence, *i. e.* growing from the seed one season and from the root the next, then bearing fruit and dying entirely.
Bifid, cleft to about the middle, into two parts. (Plate 150, fig. 4.)
Bifoliate, a leaf composed of two leaflets.
Bifurcate, forked into two branches. (Plate 132, fig. 1.)
Bijugate, see *Biconjugate*.
Bilabiate, two-lipped (as the corolla, fig. 3, plate 121).
Bilamellate, of two plates—*lamellæ* (the style of fig. 2, plate 152).
Bilobed, two-lobed (as the gland, fig. 5, plate 150).
Bilocular, two-celled (as the anther, fig. 3, plate 125).
Bipinnate, twice pinnate.
Bipinnatifid, pinnatifid with the lobes again pinnatifid.
Biserrate, doubly serrate (the leaf margins, fig. 2, plate 69).
Biternate, the principal divisions three, each bearing three leaflets. (Plate 4, fig. 2.)
Bladdery, inflated and thin, like the pod of *Lobelia inflata*. (Plate 99, fig. 3.)
Blade of a leaf; the expanded portion.
Boat-shaped, see *Scaphoid*.
Bract, a small leaf or scale of the axil from which some other part of the plant grows. (Plate 146, fig. 1.)
Bractlet, a bract seated upon the pedicel of a flower. (Plate 172, fig. 2.)
Branch, a woody division of a stem or root.
Bristles, stiff, sharp hairs (on the leaves of plate 62).
Bud, a branch in its undeveloped state.
Bulbous, bulb-shaped.

Caducous, dropping off very early, like the sepals of *Podophyllum*, which fall as the flower expands.
Cæspitose, growing in tufts like turf.
Calceolate, slipper-shaped.
Callose, hardened, or having callosities (hardened spots).
Calyculate, having an accessory calyx outside of the true. (Plate 31, fig. 3.)
Calyx, the outer (usually green) set of floral leaves. (Plate 128, fig. 2.)
Campanulate, bell-shaped (said of a flower when like fig. 4, plate 102).
Campylotropous, said of an ovule or seed when bent upon itself, like that of fig. 8, plate 14.
Canaliculate, channeled with a longitudinal groove.
Cancellate, latticed. (Plate 99, fig. 4.)
Capillaceous, *capillary*, hair-like in shape.

Capitate, having a globular apex, like a pin's head (fig. 4, plate 1), or forming a head (as the inflorescence of plates 62 and 76).

Capitillate, diminutive of *capitate* (the apices of fig. 7, plate 122).

Capriolate, bearing tendrils. (Plate 40, fig. 2.)

Capsule, any dry, dehiscent pod. (Plate 104, fig. 4.)

Capsular, relating to a capsule.

Carina, a keel; the two anterior petals of a papillionaceous flower. (Plate 56, fig. 3 *c*.)

Carinate, keeled; furnished with a ridge on one side. (Plate 61, fig. 6.)

Carneous, flesh-colored.

Carnose, for this work see *Sarcous.*

Carpel, a simple pistil. (Plate 57, fig. 5.)

Carpellary, having the appearance of a carpel, or pertaining to such.

Carpophore, the stalk of a fruit within the flower. (Plate 149, fig. 6.)

Cartilaginous, firm and tough; cartilage-like.

Caruncle, a warty excrescence upon a seed. (Plate 151, fig. 12.)

Carunculate, having a caruncle.

Catkin, a scaly, deciduous spike of flowers. (Plate 162.)

Caudate, having a tail. (Plate 1, fig. 8.)

Caulescent, obviously stemmed. (Plate 81, fig. 1.)

Cauline, belonging, or pertaining, to the stem (In plate 171, fig. 1, the upper leaf is cauline; the lower, radical.)

Cell, a cavity more enclosed than a pit.

Centrifugal, said of anything that is produced, or extends, from the center outward.

Centripetal, the opposite of *Centrifugal.*

Cernuous, nodding at the summit (the flower of plate 19).

Chaff, small, membranous scales found upon the receptacle of some Compositæ.

Chaffy, having chaff, or a chaff-like texture.

Channeled, hollowed out like a gutter, like the petioles of the plantain. (Plate 107.)

Characteristic, a trait, or form, belonging to individuals.

Chartaceous, papery, or parchment-like in character.

Chlorophyl, the green coloring matter of plants.

Cicatrix, the scar left by the fall of some portion of a growth.

Ciliate, having a fringe like eye-lashes (*cilia*) upon the margin. (Plate 122, fig. 2.)

Cinereous, having an ashy hue.

Circinate, rolled inwards from the top. (Plate 51, fig. 5.)

Circumscissile, dividing by an equatorial line. (Plate 108, fig. 3.)

Clathrate, see *Cancellate.*

Clavate, club-shaped; narrower below than above. (Plate 167, fig. 3.)

Claw, the narrow, stalk-like base of some petals. (Plate 51, fig. 4.)

Climbing, rising by the help of some other object.

Club-shaped, see *Clavate.*

Clustered, aggregated in a bunch (as the leaves of plate 15).

Coalescent, growing together (as the filaments, fig. 2, plate 50).

Cochleariform, spoon-shaped.

Coherent, growing together from first to last, *i. e.*, their whole length (the styles, fig. 5, plate 69).

Columella, the axis to which the carpels of a compound fruit are attached. (Plate 32, fig. 5).

Column, the united stamens and pistils of an orchid. (Plate 170, fig. 4.)

Columnar, column-like (the style of fig. 4, plate 102).

Coma, a tuft.

Comose, bearing a tuft of hairs. (Plate 134, fig. 4.)

Commissure, a line of junction (as seen in fig. 7, plate 168; fig. 11, plate 150; fig. 8, plate 152, etc.).

Compound leaf, fig. 2, plate 69; *compound pistil*, fig. 5, plate 30; *compound umbel*, fig. 1, plate 63.

Compressed, flattened upon opposite sides (the seeds, fig. 12, plate 11).

Conduplicate, folded upon itself on its longest diameter, like a double sheet of note paper.

Cone, a dry, compound fruit, like that of the pine. (Plate 164, fig. 2.)

Confluent, blended together. See *Coherent*.

Conjugate, coupled in single pairs. (Plate 149, fig. 4.)

Connate, see *Coherent*.

Connective, that portion of the anther that connects its cells. (Plate 1, fig. 6.)

Connivent, brought close together (the styles, fig. 2, plate 13).

Contorted, twisted together.

Contracted, either narrowed or shortened (corolla, fig. 4, plate 138).

Convolute, rolled up lengthwise, one edge over the other.

Cordate, heart-shaped at the base. (Plate 109, fig. 2.)

Coriaceous, leathery.

Corm, a solid bulb. (Plate 168, fig. 3.)

Corneous, horny.

Corniculate, bearing a small horn-shaped appendage (the lateral lobe of fig. 4, plate 121).

Corolla, usually the inner flower leaves, generally showy in form or color. (Plate 128, fig. 2.)

Corona, a crown-like appendage, or group of the same. (Plate 134, fig. 3.)

Coronate, crowned (the achenium of fig. 4, plate 93).

Corymb, a flat, or convex, flower-cluster where the peduncles or pedicels do not all issue from the same point upon the stem.

Corymbose, like a corymb in form. (Plate 30, fig. 2.)

Cotyledons, the leaves of the embryo—as the oily meats of the butternut, which consist of the cotyledons only, joined by their connective.

Crateriform, shaped like a goblet.

Creeping, growing horizontally upon, or beneath, the ground. (Plate 104, fig. 1.)

Cremocarp, the double achenium of the Umbelliferæ. (Plate 68, fig. 7.)

Crenate, scalloped upon the edge with rounded teeth. (Plate 158, fig. 2.)

Crested, bearing an elevated appendage like a crest. (Plate 45, fig. 4.)

Crinite, furnished with long hairs (calyx and leaf bases of plate 31).

Crown, see *Corona*.

Cruciate, or *Cruciform*, shaped like a cross. (Plate 58, fig. 3.)

Crustaceous, hard and brittle.

Cryptogamous, said of plants that bear no flower—as mosses, ferns, and lichens.

Cucullate, hood-shaped (fig. 6, plate 45, the stigma).

Cuneate, *Cuneiform*, wedge-shaped (the leaflets of plate 48).

Cup-shaped, *Cupuliform*, wine-glass-shaped (the corolla, fig. 3, plate 79).

Cuspidate, tipped with a sharp, stiff point (the apex of fig. 2, plate 179).

Cut, see *Incised*.

Cyathiform, shaped like a wine-glass.

Cylindraceous, approaching to a

Cylindrical form, as stems that are round and gradually tapering. (Plate 179, fig. 2.)

Cyme, a centrifugal inflorescence. (Plate 75, fig. 1.)

Cymose, having a cyme-like character.

Deca, ten; when preceding Greek derivatives.

Decagynous, ten-pistiled, or ten-styled.

Deciduous, falling later than caducous, *i. e.*, before the formation of fruit.

Declined, turned downwards, or to one side (as the stamens, fig. 3, plate 43).

Decompound, more than once compounded or divided (the leaves of fig. 1, plate 64).

Decumbent, reclined upon the ground, the summit tending to rise (the root-stock of plate 104).

Decurrent, said of leaves that are prolonged down the stem beyond their point of insertion upon it. (Plate 163, fig. 2.)

Decussate, a successive arrangement of pairs which cross each other (the leaves of plate 79).

Definite, of a uniform number.

Deflexed, bent downward at an angle (as some of the leaves in plate 140).

Deflorate, beyond the flowering state—as an anther after the pollen is discharged.

Dehiscence, the method of bursting or splitting open (as seen in fig. 4, plate 104).

Dehiscent, a regular mode of splitting.

Deliquescent, branching so that the stem is lost in the branches. (Plate 132, fig. 1.)

Deltoid, shaped like the Greek letter *Δ*.

Dentate, toothed (the leaf margins of plate 153).

Denticulate, the diminutive of *Dentate* (the leaf margins of plate 55).

Depauperate, starved or impoverished.

Depressed, flattened from above downward (as the seeds in fig. 12, plate 11).

Descending, bent gradually downward (as the fruiting axis of plate 69).

Dextrorse, turned to the right.

Di-, two; in Greek compounds, as

Diadelphous, said of stamens when united in two sets by their filaments. (Plate 50, fig. 2.)

Diandrous, having but two stamens. (Plate 119, fig. 3.)

Dichogamous, said of the styles when protruding from the bud.

Dichotomous, two-forked.

Dicotyledonous, having a pair of cotyledons—as in the butternut.

Didynamous, having two pairs of stamens—the one shorter than the other. (Plate 109, fig. 4.)

Diffuse, widely and irregularly spreading.

Digitate, said of a compound leaf when the leaflets are given off from the apex of the petiole. (Plate 44, fig. 1.)

Digynous, having two pistils or styles. (Plate 68, fig. 6.)

Dimorphous, of two forms.

Diœcious, when the stamens are in separate flowers on different plants (as in plate 154).

Dipetalous, two-petaled; *diphyllous*, two-leaved; *dipterous*, two-winged.

Disciform, or *Disk-shaped*, flat and circular. (Plate 164, fig. 9.)

Disk, the face of any flat, circular body; the central part of a head of flowers—as in the sunflower.

Disk-floret, the flower of a disk in *Compositæ*.

Dissected, cut deeply into many divisions (as the leaves of plate 86).

Dissepiments, the partitions of an ovary or a fruit (as seen in fig. 5, plate 173).

Distinct, not in combination with each other (as the styles, fig. 5, plate 30).

Divaricate, straddling widely apart (as the branches of plate 149).

Divided, cut into divisions that extend almost to the mid-rib (leaf 2, plate 4).

Dodeca, twelve.

Dorsal, pertaining to the back (*dorsum*).

Double-flowers, so-called; when the petals are unduly multiplied.
Downy, clothed with a coat of soft hairs.
Drupe, a stone fruit—like the plum, peach, cherry, etc.
Drupaceous, partaking of the nature of a drupe.
Ducts, closed channels.
Dumose, bushy.
Dwarf, low in stature.

E or *Ex*, when beginning compound words, signifies an absence of; as, *edentate*, toothless; *exstipulate*, destitute of stipules.
Ebracteate, without bracts.
Echinate, armed with prickles (the pod of Æsculus Hippocastanum, plate 44). *Echinulate*, a diminutive of it. (Plate 93, fig. 7.)
Effete, past bearing (as the anther of fig. 4, plate 110).
Elaters, the erectile appendages of the spores of Equisetum. (Plate 179, fig. 6.)
Elliptical, oval or oblong, with the ends regularly rounded. (Plate 61, fig. 1.)
Emarginate, notched at the apex (the white, involucral lobes of plate 71).
Embryo, the rudimentary plantlet in the seed. (Plate 140, fig. 10.)
Endocarp, the inner layer of the walls of a fruit.
Endogenous, when the stem exhibits no distinction as to bark, wood and pith, the woody fibre and vessels being in bundles and scattered in the cellular tissue, *i. e.*, "inside growing."
Endosperm, the same as *Albumen*, which see.
Enneandrous, having nine stamens.
Ensiform, sword-shaped (as the leaves of plate 173).
Entire, when the margins of an organ are not at all toothed, cut, or divided, but perfectly even (as in the leaves of plate 170).
Ephemeral, lasting a day or less.
Epi-, upon; as
Epicarp, the exterior layer of a fruit.
Epidermis, the covering of an organ—its external skin.
Epigæous, growing close upon the ground.
Epigynous, upon the ovary (as seen in fig. 2, plate 61).
Epipetalous, borne upon the petals (as the filaments in fig. 3, plate 172).
Epiphyllous, borne upon a leaf.
Equal, of the same number or length, as the case may be, of the body in comparison.
Equitant, riding astraddle (as the bases of the leaves, plate 171).
Erose, as if gnawed.
Essential Organs of the flower, those absolutely necessary to fertilization, *i. e.*, the stamens and pistils.
Estivation, see *Æstivation*.
Evergreen, keeping its leaves until replaced by others, or even longer.
Exalbuminous, without albumen.
Excurrent, said of a tree when the trunk is traceable to the very top. (Plate 163, fig. 1.)
Exogenous, plants with stems composed of bark, wood and pith, *i. e.*, "outside growing."
Explanate, spread, or flattened out. (Plate 25, fig. 9.)
Exserted, protruding out of; said of stamens and pistils when surpassing the floral envelope (see figs. 3 and 4, plate 33).
Exstipulate, destitute of stipules.

Extra-axillary, said of anything a little out of the axil (as the prickles on fig. 1, plate 33).

Extrorse, turned outward; said of an anther when it opens away from the pistil. (Plate 72, fig. 2.)

Falcate, scythe-shaped. (Plate 147, fig. 4.)

Family, a collection of closely related genera.

Farinaceous, mealy in texture. (Plate 172, fig. 2.)

Fascicle, a close cluster.

Fascicled, growing in a bundle; *Fasciculate* (the leaves of plate 15).

Fastigiate, upright, close and parallel. (Plate 69, fig. 5.)

Faveolate, honey-combed.

Feather-veined, see *Pinnate*.

Female flowers, those having pistils but no stamens. (Plate 33, fig. 4.)

Fenestrate, pierced with one or more large holes.

Ferrugineous, resembling iron rust.

Fertile, capable of producing.

Fertilization, the process by which the pollen causes the embryo to become fertile.

Fibrous, composed of fibres.

Filament, the slender portion of a stamen supporting the anther (fig. 3, plate 34), or any thread-shaped appendage.

Filamentous, formed of threads.

Filiform, thread-shaped, long, slender and cylindrical. (Plate 113, fig. 3.)

Fimbriate, fringed (as seen between the stamens of fig. 3, plate 119).

Fistulose, hollow and cylindrical. (Plate 68, fig. 2.)

Flavescent, yellowish.

Fleshy, see *Sarcous*.

Fleshy Plants, those containing a great deal of substance (as that of plate 61).

Flexuous, gently bending in opposite directions. (Plate 124, fig. 1.)

Floccose, bearing tufts of long, soft hair.

Flora, an aggregation of the plants of any certain district.

Floral, pertaining to the blossom.

Floral Envelope, the leaves of the flower; includes either calyx or corolla, or both.

Floret, a diminutive flower (only used when several flowers are in the same head).

Flower. This word comprises the organs of reproduction and their envelope. (Plate 128, fig. 2.)

Foliaceous, leaf-like.

Foliole, leaflet.

Follicle, a simple pod, opening down the inner suture. (Plate 50, fig. 4.)

Follicular, like a follicle.

Foramen, a hole or orifice (as in the anther-cells of fig. 3, plate 104).

Fornicate, arching over (as in the upper lobe of the corolla, fig. 3, plate 121).

Foveate, or *Foveolate*, deeply pitted. (Plate 105, fig. 6.)

Free, not united with any other parts of a different kind.

Fringed, having a margin beset with slender appendages. (Plate 109, fig. 6.)

Fructification, the state of fruiting.

Fruit, the matured ovary and everything connected with it. (Plate 104, fig. 4.)

Frutescent, somewhat shrubby.

Fruticose, shrubby.

Fugacious, quickly falling or perishing.

Fulvous, tawny.
Funiculus, the stalk of a seed or ovule.
Funnel-form, gradually expanding upwards (the corolla, plates 127 and 130).
Furcate, forked.
Furfuraceous, branny.
Furrowed, marked by longitudinal grooves. (Plate 63, fig. 2.)
Fusiform, shaped like a spindle (the pod of fig. 7, plate 22).

Galeate, helmet-shaped (the upper petal, fig. 3, plate 121).
Gamopetalous, see *Monopetalous*.
Gamosepalous, see *Monosepalous*.
Geminate, twin (the flowers of fig. 2, plate 77).
Gemmation, the budding state.
Geniculate, bent abruptly, like a knee. (Plate 54, fig. 7.)
Genus, a group of like species.
Germ, the point of beginning of a growth.
Germination, the development of an embryo into a plantlet.
Gibbous, swollen at one place or on one side (base of style, fig. 6, plate 117).
Glabrate, almost glabrous, or becoming so with age.
Glands, small organs which secrete some oily or nectariferous product of the part, or any small swelling, whether it secretes or not (see base of petal, fig. 5, plate 15).
Glandular, furnished with glands.
Glaucescent, slightly glaucous.
Glaucous, covered with a fine, white powder that rubs off; as the bloom of the grape.
Globose, spherical, or nearly so (ovary of fig. 4, plate 125).
Globular, nearly globose (base of style, fig. 6, plate 117).
Glomerate, closely aggregated into a dense cluster (the fruits of fig. 1, plate 143).
Glomerule, a dense, head-like cluster. (Plate 94, fig. 1.)
Granular, composed of grains.
Granule, a small grain.
Guttate, spotted as if by colored drops (the petals of Hypericum, as represented by fig. 8, plate 30).
Gymnospermous, naked-seeded (as seen in fig. 5, plate 163).
Gynandrous, where the stamens are borne on the pistil. (Plate 170, fig. 4.)
Gynœcium, name for the pistils when taken altogether.
Gynobase, a special support for the pistils (as seen in fig. 4, plate 146).

Habitat, a situation in which a wild plant grows.
Halberd-shaped, see *Hastate*.
Halved, when a body appears as if one half were taken away. (Plate 169, fig. 3.)
Hastate, shaped like a halberd (see leaves, plate 123).
Head, an aggregation of florets more or less globose (see plate 76).
Heart-shaped, of the shape a heart is commonly drawn. See *Cordate*.
Hemi-, half; in Greek derivatives, as
Hemicarp, half-fruit. See *Mericarp*.
Hemitropous, nearly the same as *Amphitropous*, which see.
Hepta-, seven; in Greek derivatives, as
Heptagynous, having seven pistils or styles.
Heptandrous, seven-stamened.

Herb, a plant that dies down to ground in autumn.
Herbaceous, like an herb.
Hermaphrodite, same as *Perfect*, which see.
Heterogamous, bearing two sorts of flowers as to their stamens and pistils, as in many Compositæ.
Heteromorphous, having more than one shape (the leaves, figs. 2, 3, 4, 5, plate 151).
Hexa-, six; in Greek derivatives; as, *hexagonal*, six-angled.
Hexagynous, having six pistils or styles.
Hexandrous, six-stamened.
Hilum, a scar of attachment of a seed. (Plate 43, fig. 5.)
Hirsute, hairy.
Hispid, beset with stiff hairs.
Hoary, greyish-white.
Homogamous, when the flowers are all of one kind in the head.
Homogeneous, all of one kind.
Homotropous, curved one way.
Hood, see *Galea*.
Horn, a spur or like appendage.
Hybrid, a cross between two allied species.
Hypocrateriform, salver-shaped (the corolla of plate 108).
Hypogynous, inserted under the pistil (as the stamens, fig. 3, plate 69).

Icosandrous, when twelve or more stamens are inserted upon the calyx.
Imbricate, *-ed*, or *-ive*, placed like shingles upon a roof (as the scales of the cones, plate 163).
Imparipinnate, pinnate, with a single leaflet at the apex of the common petiole (as in fig. 5, plate 50).
Imperfect flowers, wanting one or the other of the essential organs (as in figs. 3 and 4, plate 33).
Incised, deeply and irregularly cut (the leaves of plate 95).
Included, when of the parts in question some do not project beyond others.
Incomplete flowers, those in which the calyx or corolla is wanting.
Incumbent, leaning or resting upon, as anthers when looking inwards.
Incurved, curving inward. (Plate 67, fig. 5.)
Indefinite, too numerous to mention, or when the parts are not uniform in different individuals.
Indehiscent, said of a fruit that neither splits nor bursts. (Plate 37, fig. 6.)
Indigenous, a native of the country in which it is found.
Individual, different plants of the species.
Induplicate, with the edges turned inward (the top leaves of plate 74).
Inferior, grown below some other organ (as the ovary, fig. 3, plate 70).
Inflated, puffed out like a bladder. (Plate 99, fig. 3.)
Inflexed, bent inward at an angle.
Inflorescence, the arrangement of flowers on the stem.
Infra-axillary, beneath an axil.
Infundibuliform, see *Funnel-shaped*.
Innate, said of an anther when attached to the very tip of its filament. (Plate 58, figs. 4 and 5.)
Insertion, the point at which an organ or part of an organ is attached to another.
Introrse, facing inward.

Inverse, or *Inverted*, in a position opposed to an original direction. (Plate 104, fig. 3.)
Involucel, a small involucre.
Involucre, a set of bracts around a flower (plate 1), umbel (plate 148), or head (plate 62).
Involute, grown inwards from the edges (the upper leaves of plate 74).
Irregular flowers. This name is given when members of the same sort as, for instance, the petals are unlike in shape or size (fig. 3, plate 46).

Jointed, separate or separable at one or more places into pieces (the stamens, fig. 2, plate 148; the plant, plate 61).

Keel, see *Carina*.
Kidney-shaped, resembling a kidney in general outline. (Plate 61, fig. 6.)

Labiate, lipped. (Plate 97, fig. 7.)
Laciniate, slashed into deep narrow lobes (the leaves of plate 95).
Lactescent, milky, or producing a milky juice.
Lamellar, consisting of flat plates.
Lanate, woolly.
Lanceolate, lance-shaped (leaves of plate 114).
Lanuginous, cottony.
Lateral, pertaining to one side.
Lax, the opposite of crowded.
Leaflet, one of the divisions of a compound leaf.
Legume, a simple pod that splits into two pieces—like that of the pea.
Leguminous, pertaining to legumes, or the order *Leguminosæ*.
Lenticular, lens-shaped. (Plate 152, fig. 8.)
Ligneous, woody.
Ligulate, having a ligule.
Ligule, the strap-shaped limb of the corolla of many *Compositæ*. (Plate 81, fig. 5.)
Limb, the border of a monopetalous corolla.
Linear, flat and narrow, with parallel margins, as the leaves of the hemlock. (Plate 164, fig 3.)
Lineate, marked with parallel lines.
Lip, the principal lobes of a bilabiate corolla or calyx (plainly seen in the flowers of plate 113); also the peculiar petal of the orchids. (Plate 170, fig. 3.)
Lobe, any division of a leaf or other organ.
Loculicidal, splitting through the middle of the dorsum of each cell. (Plate 23, fig. 5.)
Lunate, crescent-shaped.
Lyrate, lyre-shaped. (Plate 24, fig. 2.)

Maculate, spotted or blotched. (Plate 68, fig. 2.)
Male flower, having stamens but no pistils. (Plate 33, fig. 3.)
Mammæ, teat-like projections. (Plate 103, fig. 2.)
Marcescent, withering without falling off (as the petals of plate 30).
Marginal, belonging to the edge.
Masked, see *Personate*.
Medium, pertaining to the middle.
Medullary, having the nature of pith.
Membranaceous, membrane-like (as the sheaths, fig. 2, plate 168).

Mericarp, one carpel of an umbilliferous fruit. (Plate 36, fig. 9.)
Midrib, the main rib of a leaf.
Monadelphous, said of stamens when united by their filaments into one set. (Plate 46, fig. 4.)
Monandrous, having only one stamen.
Moniliform, necklaced, *i. e.*, contracted at intervals. (Plate 23, fig. 5.)
Monocotyledonous, having only one cotyledon.
Monœcious, having stamens or pistils only. (Plate 33, figs. 3 and 4.)
Monogynous, having but one pistil or style. (Plate 102, fig. 4.)
Monopetalous, when the corolla is united into one piece. (Plate 102, fig. 3.)
Monosepalous, when the sepals are united into one body (as in the flower of plate 127).
Monospermous, one-seeded.
Mucronate, tipped with a short, abrupt point. (Plate 179, fig. 3.)
Multifarious, in many rows.
Multifid, many-cut.
Multilocular, many-celled.
Muricate, beset with short, hard points. (Plate 44, fig. 5.)

Napiform, shaped like a rounded turnip.
Naturalized, an introduced plant that has run thoroughly wild, and perfects its seed.
Nectar, honey, or honey-like secretions.
Nectariferous, bearing honey, or having a nectary.
Nectary, a cavity or gland that secretes nectar.
Needle-shaped, see *Acerose.*
Nerve, used to distinguish leaf-ribs or veins when parallel, and more or less straight.
Netted-veined, when the veins branch and anastomose, forming a net-work.
Nodding, said of an organ when the summit hangs downward.
Nodose, nubby.
Normal, in a usual way, according to rule.
Nuciform, nut-shaped.
Nut, a hard, bony, mostly one-seeded fruit. (Plate 43, fig. 5.)
Nutlet, diminutive of nut; the stone of a drupe.

Ob-, a prefix signifying inversion or opposition ; as
Obcordate, heart-shaped, with the notch upward, and the point of fixture or support at the apex. (Plate 25, fig. 9.)
Oblanceolate, lance-shaped, with the point downward (the leaves of plate 104).
Oblique, applied to organs having unequal sides. (Plate 147, fig. 3.)
Oblong, much longer than broad (as the brown leaf, plate 160).
Obovate, ovate, with the broadest end uppermost. (Plate 151, fig. 3.)
Obtuse, blunt-ended (the apex of leaf 3, plate 51).
Ochroleucous, dull cream-color.
Octo-, eight, in Greek derivatives; as
Octogynous, eight-pistiled.
Octandrous, eight-stamened.
Offset, a branch given off near the ground and taking root.
Opposite, said of leaves when their petioles are exactly opposite each other upon the stem. (Plate 132.)
Orbicular, circular in outline. (Plate 18, fig. 2.)
Organ, any member of a plant—as a petal, stamen, leaf, branch, etc., etc.

Orthotropous, said of an ovary when its point of attachment is at its base and the apex is in direct line with it. (Plate 28, fig. 6.)
-ose, as a suffix means like whatever root-word precedes it; as, *racemose*—like a raceme.
Osseous, bony.
Oval, broadly elliptical. (Plate 151, fig. 2.)
Ovary, that portion of the pistil that contains the ovules. (Plate 28, fig. 5.)
Ovoid, a solid oval. (Plate 28, fig. 6.)
Ovule, that organ that is destined to become a seed (plainly seen in fig. 5, plate 125).

Palea, pl. *Paleæ*, the chaff of composite receptacles.
Paleaceous, chaffy.
Palmate, when the organs in question radiate more or less from the point where some other organ is attached (the veins of the leaf, plate 18; the leaflets, plate 40 (digitate); and the lobes of the leaf, fig. 2, plate 8).
Palmately, in a palmate manner, as above.
Panicle, an open cluster (the arrangement of the flowers, fig. 1, plate 119).
Papery, see *Papyraceous*.
Papillionaceous, spreading like a butterfly. (Plate 50, fig. 1.)
Papilla, pl. *Papillæ*, small mammæ (as seen on the corolla, fig. 3, plate 79).
Pappus, thistle-down. (Plate 81, fig. 3.) In Compositæ this, with chaff, teeth, or scales, represents the calyx in this order.
Papyraceous, of the texture of writing paper.
Parenchyma, the pulp of plants.
Parietal, attached to the walls (as the ovules in fig. 5, plate 7).
Parted, cleft almost to the base. (Plate 4, fig. 4.)
Pauci-, means few when prefixed to root words. (*Pauciflorous*, few-flowered.)
Pear-shaped, solid obovate.
Pedate, palmately cleft, with the lobes again cleft. (Plate 1, fig. 2.)
Pedicel, the individual stalk of each flower in a cluster. (Plate 104, fig. 2.)
Peduncle, the main stalk of a flower cluster (fig. 2, plate 104), or the flower stalk when the plant is one-flowered (as seen above the leaves in plate 175); or when the flowers are single (as in plate 2). The same distinctions pertain to the stalk of heads and clusters (as in plates 62 and 70).
Peltate, shield-shaped (the style of fig. 3, plate 19); said of a leaf, no matter what its shape, when the petiole is attached anywhere within its margin (as in plate 18).
Pendent, hanging (the fruit of fig. 3, plate 15).
Pendulous, somewhat hanging (the flowers of plate 49).
Penicillate, like a painter's pencil. (Plate 97, fig. 6.)
Penta-, five, in Greek derivatives; as
Pentagynous, having five pistils or styles.
Pentandrous, five-stamened.
Perennial, growing on year after year.
Perfect, a flower having the essential organs.
Perfoliate, passing through a leaf, or appearing so (the leaves, plate 79).
Perforate, pierced with holes, or having transparent dots giving that appearance. (Plate 30, fig. 7.)
Perianth, the leaves of the flower, especially when they cannot be distinguished as to calyx or corolla.
Pericarp, a ripened ovary; or the fruit walls.

Perigynium, arranged around the pistil.

Perigynous, when the petals and stamens are borne on the calyx. (Plate 55, fig. 2.)

Periphery, the outside of an organ.

Persistent, remaining beyond the usual time.

Personate, the throat of a bilabiate corolla when masked by some projection (as seen in the flowers of plate 111).

Petal, a leaf of the corolla; usually bright-colored.

Petaloid, when any other organ is petal-like.

Petiole, the stem of a leaf.

Petioled, *Petiolate*, possessing a petiole.

Petiolulate, said of leaflets when having their own petioles.

Phænogamous, *Phænogams*, *Phæncrogams*, plants bearing flowers and producing seeds.

Pilose, clothed with fine soft hairs.

Pinna, the petiole of a pinnate leaf.

Pinnule, a secondary pinna of a bipinnate leaf.

Pinnate, feather-form; said of a compound leaf when its leaflets are arranged along the main petiole (as in plate 50).

Pinnatifid, cut until partaking of the nature of a pinnate leaf. (Plate 96, fig. 4.)

Pistil, the female organs of a flower (usually central), taken as a whole (fig. 5, plate 130: the lowest portion is the receptacle; next above, the ovary; next, the style, and at the apex, the stigmas).

Pistillate, said of a flower having pistils and no stamens. (Plate 33, fig. 4.)

Pith, the central portion of exogenous stems.

Pitted, having small depressions upon the surface.

Placenta, that surface or part of an ovary to which the ovules are attached. (Plate 25, fig. 10.)

Placentiferous, having the nature of a placenta, or having placentæ.

Plaited, arranged like a fan that admits of closure.

Plane, flat.

Plicate, see *Plaited*.

Plumose, feathery. (Plate 1, fig. 9.)

Pluri-, in composition, several; as

Plurifoliate, many-leaved.

Pod, any kind of capsule. (Plate 11, fig. 11; plate 22, fig. 7; plate 24, fig. 3; plate 132, fig. 3.)

Pollen, the fertilizing agent of a plant, formed in the anther cells. It is varied in form, but usually granular. (Plate 107, fig. 5; plate 1, fig. 7; plate 16, fig. 8; plate 22, fig. 9; plate 27, fig. 5; plate 47, fig. 5; plate 68, fig. 8; plate 83, fig. 8; plate 93, fig. 7; plate 101, fig. 5; plate 163, fig. 11; plate 164, fig. 9; plate 167, fig. 6; plate 103, fig. 5; plate 105, fig. 6; plate 109, fig. 7; plate 169, fig. 10, and plate 175, fig. 4.)

Pollen-mass, applied when the grains cohere into a mass. (Plate 135, fig. 4.)

Poly-, many; in Greek derivatives; *multi* in Latin, as

Polyadelphous, when stamens are united by their filaments. (Plate 50, fig. 2.)

Polyandrous, many-stamened, more than twenty.

Polygamous, having perfect and separate flowers upon the same plant.

Polygonal, many-angled.

Polygynous, many-pistilled or -styled.

Polymorphous, of varying forms.

Polypetalous, when the petals are separate or distinct (whether few or many). Opposed to *Monopetalous*.

Polysepalous, same as the above when applied to the calyx. Opposed to *Monosepalous.*

Porous, full of holes.

Præfloration, same as *Æstivation*, which see.

Præfoliation, same as *Vernation*, which see.

Præmorse, ending abruptly (the root of plate 177).

Prickles, short, angular thorns. (Plate 33, fig. 1.)

Prismatic, having three or more angles bounding flat or hollowed sides.

Process, a superficial projection.

Procumbent, trailing upon the ground.

Prostrate, lying flat upon the ground.

Puberulent, covered with an almost invisible down.

Pubescent, downy.

Pulverent, see *Glaucous;* or if the powder is only such in appearance.

Punctate, see *Perforate.*

Pyramidal, shaped like a pyramid.

Pyrene, *Pyrena*, the nutlet, especially said of a drupe when small.

Pyxis, *Pyxidium*, a pod opening by a circumscissile line; the top falling off like a lid, (Plate 108, fig. 3.)

Quadri-, four; in Latin derivatives.

Qudrangular, four-angled.

Quadrifid, four-cleft.

Quaternaie, in fours.

Quinate, in fives.

Raceme, where one-flowered pedicels are arranged in succession along a general peduncle. (Plate 11, fig. 1.)

Rachis, see *Rhachis.*

Radiate, pertaining to the ray.

Radicle, the stem part of the embryo.

Raphe, see *Rhaphe.*

Ray, the marginal flowers of a composite head, especially when different from the rest, and diverging. The pedicels of an umbel (seen in the flowers of plate 84, and the umbel, plate 68).

Receptacle, the support of a flower, *i. e.*, the thickened upper surface of the apex of the peduncle or pedicel (fig. 4, plate 1); particularly, however, the place of attachment of the flowers of a head.

Recurved, curved outward or backwards (the styles, fig. 5, plate 130.)

Reflexed, bent outward and downward. (Plate 134, fig. 3.)

Regular, when the parts are all similar.

Reniform, see *Kidney-shaped.*

Repand, wavy-margined. (Leaves of plate 39.)

Repandly-toothed, rounded-toothed (the margins of the leaves, plate 7).

Repent, creeping along the ground by successive rootings.

Reticulated, formed into a net-work, or rather appearing as if covered by a net. (Plate 99, fig. 4; plate 167, fig. 2.)

Retroflexed, same as *Reflexed*, which see.

Retuse, so blunt at the apex as to be slightly indented.

Revolute, rolled backward; usually said of margins of organs or their extremities (both phases are apparent in the petals, fig. 2, plate 71).
Rhachis, back-bone; the axis of a spike.
Rhaphe, the prolongation of a seed stalk along the side of an ovule. (Plate 22, fig. 6.)
Rhizoma, the main root.
Rib, the main and largest pieces of the frame work of a leaf.
Ringent, gaping open (the flowers of plate 113).
Rootlets, small branches of a rhizome. (Plate 138, fig. 2.)
Rootstock, that portion of the stem where it joins the root. (Plates 20 and 167, fig. 2.)
Rostrate, bearing a beak. (Plate 4, fig. 5.)
Rosulate, forming a rosette (as the leaves, fig. 1, plate 29).
Rotate, wheel-shaped (the corollas of plate 108).
Rotund, having a roundish outline (the leaves, fig. 1, plate 77).
Rudimentary, imperfectly developed.
Rugose, wrinkled (as the corm of plate 168).
Runner, a slender, postrate branch, rooting at the end or joints. (Plate 17, fig. 2.)

Sac, a closed membrane.
Sagittate, shaped like an arrow-head.
Salver-form, when the limb of the corolla spreads at right angles from a slender tube.
Samara, a winged fruit. (Plate 35, fig. 9.)
Sarcous, (in this work) fleshy.
Saw-toothed, see *Serrate*.
Scales, small bracteate rudiments of leaves, or bodies of that nature (as on the base of the stem, fig. 1, plate 105).
Scandent, climbing.
Scape, a peduncle when starting from near the ground (as in fig. 2, plate 19).
Scaphoid, boat-shaped.
Scarious, thin and dry.
Scorpioid, circinate at the end (as the unilateral racemes, plate 57).
Scurf, dandruff-like superficial scales.
Scutellate, platter-shaped (seen upon the *rachis*, fig. 6, plate 151).
Segment, one of the subdivisons of any cleft body.
Segregate, see *Separate*.
Semi-, half; in Latin derivatives.
Semiconoid, depressed-conoidal.
Sempervirent, see *Evergreen*.
Sepal, a lobe of the calyx. (Plate 128, fig. 2.)
Sepaloid, having the appearance of a sepal.
Septa, partitions (seen in fig. 5, plate 173).
Septicidal, said of a pod that splits through its partitions.
Seriaceous, silky.
Serrate, having teeth like a saw (leaf margins, plates 40, 69, 70, etc.).
Serrulate, diminutive of the last.
Sessile, said of organs that have no individual stem (as the leaves of plates 28 and 30; the anthers, fig. 5, plate 138, etc.).
Seta, a bristle.
Sheathing, wrapped around a stem (the bases of the leaves, plates 31 and 167; the stipules, plates 64, 68, etc.).

Shield shaped, see *Peltate*.
Silicle, a pouch, or short pod. (Plate 25, fig. 9.)
Silique, a long pod of the mustard family. (Plate 23, fig. 5.)
Simple, of one piece.
Sinistrorse, turned to the left.
Sinuate, said of a leaf when its margin waves out and in. (Plate 143, fig. 2; plate 19, fig 1.)
Sinus, the recess between two parts of an organ (as the re-entering angle in the fruits of plate 174).
Solitary, unassociated with its kind.
Solarly, with the sun;—*solarly voluble*, turning daily to keep face to the sun.
Spadix, a fleshy spike of flowers. (Plate 167, fig. 3; plate 169, fig. 6.)
Spathe, a large bract covering an inflorescence. (Plate 169, fig. 2.)
Spatulate, shaped like a spatula. (Plate 105, fig. 3.)
Species, the individuals of a genus having special characters belonging to themselves and no other known plant.
Spicate, belonging to or disposed like a
Spike, an arrangement of flowers similar to a raceme, but the flowers are sessile (as in plate 107).
Spine, a thorn (as seen on fig. 1, plate 61).
Spindle-shaped, see *Fusiform*.
Spinescent, degenerating into a thorn (as the end of the branch, plate 41).
Spinose, thorny. (Plate 15, fig. 1.)
Spore, the reproducing grains of cryptogams.
Squamate, *Squamose*, scaly. (Plate 105, fig. 1.)
Squarrose, where scales, leaves, or other appendages, spread widely from the axis.
Stalk, a stem.
Stamen, the male organ of a flower (usually arranged around the pistil, and appearing generally like those seen in fig. 2, plate 10. In fig. 3, plate 34, an enlarged stamen is depicted; the stem part is the filament; the head, the anther).
Standard, the upper petal of a papillionaceous corolla. (Plate 46, fig. 3 *a*.)
Stellate, disposed in a star-like manner.
Sterile, incapable of producing its kind.
Stigma, the highest point of a pistil (see *Pistil*); the receptive portion of the female organs of a plant. (Plate 178, fig. 4.)
Stigmatose, that portion of a style resembling a stigma in being capable of receiving the pollen.
Stipe, the stalk of a pistil, or ovule when present. (Plate 149, fig. 6)
Stipel, the stipule of a leaflet.
Stipitate, being possessed of a stipe (as the ovule, fig. 6, plate 28).
Stipulate, having stipules.
Stipules, the appendages at the base of certain leaves (seen in plate 151).
Stoloniferous, producing stolons or rooting shoots.
Stomata, the breathing pores of leaves. (Plate 179, fig. 8.)
Strap-shaped, long, flat and narrow.
Striate, marked with longitudinal, slender grooves.
Strict, straight.
Strobile, a multiple, cone-shaped fruit. (Plate 159, fig. 5; plate 155, fig. 1.)
Style, that portion of the pistil that unites the stigma to the ovary (see description of pistil).
Sub-, almost; as, subcordate, nearly heart-shaped.

Subulate,—Awl-shaped, which see.
Succulent, pulpy, or juicy.
Suffrutescent, slightly shrubby.
Sulcate, deeply channelled.
Supra-axillary, growing above an axil.
Suspended, hanging down (as the ovule, fig. 3, plate 12).
Suture, a line of junction when parts are grown together.
Sword-shaped, see *Ensiform.*
Symmetrical flower, one whose parts are equal in number, each kind with the other, or in multiples (flower of plate 175).
Syngenesious, said of stamens when united by their anthers.

Taper-pointed, tapering gradually to a point. See *Acuminate.*
Tap-root, a stout root with a tapering body. (Plate 63, fig. 7.)
Tawny, dull brownish-yellow.
Terete, long and round; same as cylindrical, only may taper. (Plate 132, fig. 3.)
Terminal, belonging to the summit.
Ternate, arranged in threes.
Testa, the external seed coat.
Tetra-, four; in Greek composites; as,
Tetradynamous, when having six stamens, two of them shorter than the rest. (Plate 23, fig. 2.)
Tetragonal, four-angled.
Tetragynous, four-pistilled or -styled.
Tetrandrous, four-stamened.
Theca, a case.
Thorn, see *Spine.*
Thread-shaped, see *Filiform.*
Throat, the opening of a tubular corolla, a little below the ring where the limb joins the tube.
Thyrsus, a compact pyramidal panicle. (Plate 43, fig. 1.)
Tomentose, woolly.
Toothed, furnished with sharp projections on the margin that do not point forward.
Top-shaped, cone-shaped, the apex downward.
Torus, the receptacle of the flower. (Plate 1, fig. 4.)
Tri-, three; as
Triadelphous, said of stamens when united by their filaments into three bundles.
Triandrous, three-stamened.
Trifid, three-cleft.
Trifoliate, three-leaved.
Trifoleolate, of three leaflets. (Plate 48.)
Trygynous, having three pistils or styles. (Plate 56, fig. 3.)
Trilobed, having three lobes (the leaves of plate 2).
Triquetrous, sharply three-angled—like a beechnut.
Triternate, three times ternate, *i. e.*, divided into threes three times.
Triticose, shaped like a grain of wheat. (Plate 110, fig. 6.)
Trumpet-shaped, tubular, enlarging toward the summit (the flowers of plate 130).
Truncate, as if cut off at the apex.
Tubercle, a small excrescence.

Tubercled, pimply.
Tubular, elongated and hollow.
Tumid, swollen at one portion.
Turbinate, top-shaped.
Turgid, swollen throughout.
Turnip-shaped, broader than high, *i. e.*, narrowed below.
Twin, see *Geminate*.
Twining, see *Voluble*.
Typical, embracing all the characteristics of a species, genus, or family.

Umbel, said of an arrangement of peduncles when like the ribs of an umbrella, bearing flowers in a flat or convex canopy (as in plate 63).
Umbellet, a small umbel, formed upon the apex of a division of an umbel (as in plate 67).
Umbilicate, depressed in the centre, like one end of an apple. (Plate 139, fig. 4.)
Unarmed, destitute of spines, prickles, or like appendages.
Uncinate, hooked. (Plate 92, fig. 4.)
Undulate, see *Wavy*.
Uni, one; as *unicellular*, one-celled.
Unisexual, having stamens or pistils only. (Plate 14, figs. 3 and 7.)
Urceolate, urn-shaped.
Urticle, a small, thin-walled, one-seeded fruit. (Plate 153, fig. 5.)

Valve, one of the pieces into which a pod splits. (Plate 173, fig. 5.)
Valvate, said when parts meet each other by their edges, without over-lapping.
Vascular, containing vessels.
Vaulted, see *Fornicate*.
Veins, the small ribs forming the frame-work of leaves, or other organs.
Veiny, said when the veins are evident.
Veinlets, diminutive of veins.
Venation, the method of arrangement of veins.
Ventral, the opposite of dorsal.
Vermicular, worm-like.
Vernation, the methodical arrangement of leaves in their buds.
Verrucose, warty. (Plate 72, fig. 6.)
Versatile, attached by one point, with ability to swing to and fro. (Plate 178, fig. 3.)
Vertex, the same as *Apex*, which see.
Vertical, perpendicular; at right angles to the plane of the ground.
Verticil, a *Whorl*, which see.
Verticillaster, a whorl of small flowers, as in many mints.
Verticillate, whorled.
Vesicle, a little bladder. (Plate 153, fig. 7.)
Vexillum, the standard of a papillionaceous flower. (Plate 46, fig. 3*a*.)
Villose, shaggy, with long, soft hairs.
Virgate, wand-like. (Plate 114, fig. 1.)
Viscid, having a glutinous surface.
Vittæ, the oil-tubes of Umbelliferous fruits.
Voluble, twining (as the stem of plate 130).

Wavy, when the margin is alternately convex and concave (as the leaves of plate 19).

Wedge-shaped, see *Cuneate.*
Wheel-shaped, see *Rotate.*
Whorl, Whorled, arranged in a circle around the stem (as the leaves of plates 78 and 114).
Winged, having a membranous expansion (see *Alate*).
Woolly, clothed with entangled, soft hair.

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Abbreviations.

cf.	colored figure.
ct.	colored plate full size of page.
f.	figure.
ff.	flower figured.
lf.	leaf figured.
rf.	root figured.
sf.	fruit figured.
t.	full size plate.

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Torr. Bul., 1880, 101; Bigel. Am. Med. Bot., 2, **ct. 27,** 67; Torr. Bot. S. N. Y., 1, **ct. 5,** 27; Darl. Am. Weeds, 34; Porch. Resourc. South., 36; Gray Bot. Text., **f. 486–9,** 377; Bart. Med. Bot., **ct. 7,** 77; Journ. Mat. Med., 2, 369; Gray Man., 49; Allen Ency., 6, 142; U. S. Phar., 215; Lindl Med. Bot., 144; Griff. Med. Bot., **f. 56,** 97; Am. Disp., 507; Lindl. Flor. Med., 23; Am. Hom. Phar., 300.

Asimina triloba, 13.

Torr. Bot. S. N. Y., 1, 30; Darl. Am. Weeds, 36; Porch. Resourc. South., 41; Gray Bot. Text., **f. 490–4,** 378; Wats. Bib., 30; Gray Man., 50; Griff. Med. Bot., 101; Lindl. Flor. Med., 27; Clapp Cat., 727; Am. Hom. Phar., 106; Allen Ency., 1, 598; Am. Disp, 843; Loudon Ency., **f. 7930,** 480.

Menispermum Canadense, 14.

Raf. Med. Flor., 2, 242; Porch. Resourc. South., 376; Gray Bot. Text., **f. 495–502,** 379; Am. Jour. Phar., 1884, 401; Ludon Encyc., **f. 13, 997,** 844; Hale's Monograph, **ct.**; Jour. Mat. Med., 2, 362; Allen Ency., 6, 177; Hale New Rem., 438; Am. Disp., 522; Am. Hom. Phar., 306; Gray Man., 51; Torr. Bot. S. N. Y., 1, 31.

Berberis vulgaris, 15.

Berberidaceæ; Griff. Med. Bot., **f. 64,** 212; Hamilt. Flor. Hom., **ct. 10,** 88; Lindl. Med. Bot., **lf. 154,** 104; Torr. Bot. S. N. Y., 1, 32; Woodv. Med. Bot., 3, **t. 219,** 618; Gray Man., 52; Clapp Cat., 728; Lindl. Flor. Med., 63; Porch. Resourc. South., 51; King Am. Disp., 166; Wittstein, 26, 165; Chem. Carb. Comp., 480–1; Am. Hom. Phar., 119; Hale New Rem., 98; Gray Bot. Text., **f. 503–5,** 380; Fluck. & Han., 36; Allen Ency., 2, 139; Hughes Phar., 189; Williams Med. Bot. Mass., 878; Darl. Am. Weeds, **f** p. 37; Wigand, **rf.** 50; Loudon Ency., **f. 4922,** 286.

Caulophyllum thalictroides, 16.

Griff. Med. Bot., **f. 65,** 114; Raf. Med. Flor., **f. 19,** 97; Am. Hom. Phar., 157; Williams Med. Bot. Mass., 879; Berberidaceæ, 9; Gray Man., 53; Hughes Phar., 253; Hale New Rem., 163; Allen Ency., 3, 34; Am. Disp., 198; Clapp Cat., 729; Wats. Bib., 35; U. S. Phar., 68; Torr. Bot. S. N. Y., 1, 33; Loudon Ency., **f. 4914,** 286.

Podophyllum peltatum, 17.

New Rem., 1879, 43, 262: 1881, 47; Am. Jour. Phar., 1879, 543, 580: 1882, 108; Bot. Gaz., 1881, 178; Bull. Torr. Club, 1884, 62; Gray Bot., 54; Darl. Am. Weeds, 38; Raf. Med. Bot., 2, **t. 73,** 59; Porch. Resourc. South., 21, 77, 577; Griff. Med. Bot., **f. 66,** 115; Clapp Cat., 730; Lindl. Flor. Med., 13; Torr. Bot. S. N. Y., 1, 35; U. S. Phar., 260; Allen Ency., 8, 130; Bent. & Trim., **ct. 17**; Wittstein, 76; Am. Hom. Phar., 377; King Am. Disp., 731; Bigel. Am. Med. Bot., 2, **t. 23,** 34; Barton Med. Bot., 2, **ct. 25,** 9; Fluck. & Han., 36; Wigand, 384; Hughes Phar., 647; Loudon Ency., **f. 7652,** 460.

Nymphæa odorata, 18.

Am. Jour. Phar., 1883, 96; Bot. Gaz., 1881, 266; Raf. Med. Bot., 2, **f. 67,** 44; Bigel. Am. Med. Bot., 3, **ct. 55,** 134; Gray Man., 56; Griff. Med. Bot., 119; Lindl. Flor. Med., 20; Porch. Resourc. South., 35; King Am. Disp., 630; Porch. Pl. S. C., 693; Clapp Cat., 732; Am. Hom. Phar., 344; Hale New Rem., 445; Lindl. Med. Bot., **f. 453, 265–8,** 383; Torr. Bot. S. N. Y., 1, 39; Allen Encyc., 7, 127; Williams Med. Bot. Mass., 876; Loudon Ency., **f. 7678,** 462.

Sarracenia purpurea, 19.

New Rem., 1879, 146; Bot. Gaz., 1883, 192: 1881, 242; Torr. Bot. S. N. Y., 1, **ct. 6,** 41; Gray Bot., **lf. 224,** 383; Wigand, 93, 211; Therap. Gaz., vol. 5, 547; Loudon Ency., **f. 7676,** 462; Am. Disp., 752; Hale New Rem., 573; Watson Bib., 40; Hughes Phar., 683; Allen Ency., 8, 574; Am. Hom. Phar., 402; Gray Man., 58.

Argemone Mexicana, 20.

Griff. Med. Bot., 129; Lindl. Med. Bot., **f. 222,** 154; Darl. Am. Weeds, **sf. 19,** 41; Porch.

Resourc. South., 28; Loudon Ency., **f. 7672,** 462; Man. Weeds, 5; Am. Jour. Phar., 1885, 506; Wigand, 16; Gray Man., 59; Wittstein, 142; Allen Ency., 10, 324; Raf. Med. Bot., 2, 195; Am. Hom. Phar., 192.

Chelidonium majus, 21.

Am. Jour. Phar., 1882, 251; Griff. Med. Bot., 129; Spratt Tox., **cf. 17,** 18; Raf. Med. Flor., 2, 207; Woodv. Med. Bot., 2, **t. 140,** 388; Gray Man., 60; Torr. Bot. S. N. Y., 1, 44; Clapp Cat., 734; Lindl. Flor. Med., 17; U. S. Phar., 74; King Am. Disp., 221; Hale New Rem., 178; Wittstein, 42–3; Chem. Carb. Comp., 283, 480; Am. Hom. Phar., 162; Lindl. Med. Bot., **f. 221,** 153; Allen Ency., 3, 127; Hughes Phar., 263; Williams Med. Bot. Mass., 875; Darl. Am. Weeds, **f. 20,** 41; Wigand, 207; Loudon Ency., **f. 7653,** 460.

Sanguinaria Canadensis, 22.

New Rem., vol. 11, 163; Am. Jour. Phar., 1881, 473: 1879, 171; Griff. Med. Bot., **f. 72,** 127; Raf. Med. Flor., **f. 83,** 78; Bigel. Am. Med. Bot., 1, **ct. 7,** 75; Bent. and Trim., 1, **ct. 20**; Lindl. Med. Bot., **f. 223,** 125; Gray Man., 60; Gray Bot., **f. 519–21,** 384; Lindl. Flor. Med., 16; Porch. Cat. Pl. S. C., 639; Clapp Cat., 734; U. S. Phar., 287; Porch. Resourc. South., 30; King Am. Disp., 835; Chem. Carb. Comp., 480; Good. Bot., **ct. 2**; Hale New Rem., 557; Am. Hom. Phar., 400; Wittstein, 42; Allen Ency., 8, 481; Hughes Phar., 462; Williams Med. Bot. Mass., 875; Loudon Ency., **f. 7651,** 460; Darl. Am. Weeds, 42; Barton Med. Bot., **ct. 2,** 31.

Sinapis alba, 23.

Am. Jour. Phar., 1883, 370: 1882, 404: 1881, 121: 1883, 551; Raf. Med. Flor., 2, 263; Flor. Med., 1, **ct. 2,** 6; Bent. and Trim., 1, **ct. 23**; Griff. Med. Bot., **f. 75,** 135; Darl. Am. Weeds, 47; Loudon Ency., **f. 9269,** 554; U. S. Phar., 292; Lindl. Med. Bot., 139; Gray Man., 70; Fluck and Han., 68; Lindl. Flor. Med., 92; Allen Ency., 9, 40.

Sinapis nigra, 24.

Bent. and Trim., 1, **ct. 22**; Woodv. Med. Bot., 3, **t. 146,** 403; Gray Man., 71; Griff. Med. Bot., **f. 74,** 135; Williams Med. Bot. Mass., 876; Darl. Man. Weeds, 47; Porch. Resourc. South., 72; Loudon Ency., **f. 9256,** 554; Allen Ency., 9, 46; Am. Hom. Phar., 413.

Thlaspi Bursa-Pastoris, 25.

Darl. Am. Weeds, **f. 26,** 51; Porch. Resourc. South., 70; Gray Bot., **f. 232–3,** 386; Loudon Ency., **f. 9104,** 546; New Rem., 1879, 83; Man. Weeds, 7; Am. Disp. Suppl., **t. 5,** 55; Torr. Bot. S. N. Y., 1, 65; Gray Man., 73; Hale New Rem., 465; Am. Hom. Phar., 438; Clapp Cat., 739.

Raphanus raphanistrum, 26.

Williams Med. Bot. Mass, 876; Darl. Am. Weeds, **f. 29,** 53; Loudon Ency., **f. 9303,** 556; Allen Ency., 8, 277; Torr. Bot. S. N. Y., 1, 66; Lindl. Flor. Med., 93; Gray Man., 75; Wood Bot., 240.

Viola tricolor, 27.

Am. Jour. Phar., 1882, 10; 1883, 490; New Rem., 11, 37: 1880, 146; Bot. Gaz., 1880, 13; Spratt Tox., 28; Woodv. Med. Bot.. 2, **t. 90,** 254; Porch. Resourc. South., 76; Wigand, 206; Gray Man., 77; Gray Gen., 1, 185; Torr. Bot. S. N. Y., 2, 75; Griff. Med. Bot., 140; Clapp Cat., 741; Lindl. Flor. Med., 97; Raf. Med. Flor., 2, 375; U. S. Phar., 379; King Am. Disp., 969; Wittstein, 225; Am. Disp., 861; Am. Hom. Phar., 454; Gray Bot. Text., 387; Hughes Phar., 768; Watson Bib., 88; Allen Ency., 10, 136; Loudon Ency., 186.

Helianthemum Canadense, 28.

Raf. Med. Flor., 2, 209; Gray Man., 80; Williams Med. Bot. Mass., 917; Loudon Ency., 470; Watson Bib., 78; Allen Ency., 3, 333: Gray Bot. Text., **f. 546–52,** 360; Am. Disp., 416; Am. Hom. Phar., 178; Torr. Bot. S. N. Y., 1, 77.

Drosera rotundifolia, 29.

Bot., Gaz., 1880, 148; Am. Jour. Phar., 1885, 106; Raf. Med. Flor., 2, 217; Hamilt. Flor. Hom., 1, **ct. 30,** 256; Williams Med. Bot. Mass., 889; Porch. Resourc. South., 77; Loudon Ency., **f. 3941,** 232; Am. Disp., 339; Wittstein, 8; Hughes Phar., 252; Am. Hom. Phar., 207; Thom. Org. Chem., 109; Chem. Carb. Comp., 448; Allen Ency., 4, 170; Torr. Bot. S. N. Y., 1, 81.

Hypericum perforatum, 30.

Raf. Med. Flor., 2, 229; Strong Am. Flor., 1, **cf. 25,** 55; Lindl. Med. Bot., **f. 227,** 158; Woodv. Med. Bot., 3, **t. 208,** 587; Darl. Am. Weeds, **fig. 50–53,** 55; Porch. Resourc. South., 78; Gray Bot. Text., **f. 553–6,** 391; Wiegand, 205; Ludon Ency., **f. 11023,** 658; Mich. Man. Weeds, 7; Jour. Mat. Med., 1, 232; Gray Man., 85; Torr. Bot. S. N. Y., 1, 86; Allen Ency., 5, 53; Griff. Med. Bot., 157; Am. Hom. Phar., 252; Am. Disp. 437; Lindl. Flor. Med., 117.

Lychnis Githago, 31.

Am. Jour. Phar., 1879, 129; Torr. Bot. S. N. Y., 1, 102; Williams Med. Bot. Mass., 890; Darl. Am. Weeds, **f. 34–5,** 56; Griff. Med. Bot., 158; Ludon Ency., **f. 6535,** 386; Wittstein, 7; Mich. Man. Weeds, 10; Wats. Bib., 104; Lindl. Med. Bot., 120; Chem. Carb. Comp., 465; Am. Hom. Phar., 60; Gray Man., 90; Gray Bot. Text., 391; Chap. Bot., 52; Allen Ency., 1, 132.

Geranium maculatum, 32.

Bigel. Am. Med. Bot., 1, **ct. 8,** 84; Bent.

and Trim., **ct. 42**; Williams Med. Bot. Mass., 888; Darl. Am. Weeds, **f. 49–50,** 72; Porch. Resourc. South., 138; Gray Bot. Text., **f. 632–8,** 399; Watson Bib., 151; Allen Ency., 4, 407; Gray Man., 107; Good Bot., **ct. 22**; Lindl. Flor. Med., 221; Porch. Pl. S. C., 731; Clapp Cat., 748; Griff. Med. Bot., 209; Raf. Med. Flor., 1, **f. 42,** 215; U. S. Phar., 169; King Am. Disp., 1, 45; Am. Hom. Phar., 233; Wittstein, 90; Lindl. Med. Bot., 120; Bart. Med. Bot., **ct. 13,** 150; Loudon Ency., **f. 9656,** 580.

Xanthoxylum Americanum, 33.

Griff. Med. Bot., **f. 103,** 195; Raf. Med. Flor., 2, **f. 96,** 113; Bigel. Am. Med. Bot., 3, **ct. 59,** 156; Williams Med. Bot. Mass., 911; Porch. Resourc. South., 136; Darl. Am. Weeds, **f. 53–5,** 75; Gray Bot. Text., **f. 639–46,** 402; Loudon Ency., **f. 13896,** 834; Torr. Bot. S. N. Y., 1, 132; Gray Man., 110; Allen Ency., 10, 169; Watson Bib., 155; Lindl. Flor. Med., 216; Am. Hom. Phar., 458; Am. Disp., 871; U. S. Phar., 379.

Ptelea trifoliata, 34.

Jour. Mat. Med., 4, 290; Loudon Ency., **f. 1764,** 100; Am. Hom. Phar., 381; Gray Man., 110; Am. Disp., 680; Allen Ency., 8, 177; Hale New Rem., 526; Raf. Med. Flor., 2, 254; Hale's Monograph, 1869, **ct.**; Torr. Bot. S. N. Y., 1, 133; Clapp Cat., 753; Lindl. Flor. Med., 215.

Ailantus glandulosus, 35.

Darl. Am. Weeds, 76; Loudon Ency., **f. 14310,** 866; Am. Disp. Suppl., 20; Am. Jour. Phar., 1885, 600; Gray Man., 111; Hale New Rem., 28; Allen Ency., 1, 133; Am. Hom. Phar., 60.

Rhus glabra, 36.

Raf. Med. Flor., 2, 256; Strong Am. Flor., 1, **cf. 46,** 97; Williams Med. Bot. Mass., 911; Darl. Am. Weeds, **f. 56–8,** 78; New Remedies, 1880, 370; Jour. Mat. Med., 1, 195; Porch. Resourc. South., 202; Loudon Ency., 226; Mich. Man. Weeds, 15; Am. Hom. Phar., 390; Wats. Bib., 182; Torr. Bot. S. N. Y., 1, 129; U. S. Phar., 283; Am. Disp., 707; Allen Ency., 8, 329

Rhus venenata, 37.

Bigel. Am. Med. Bot., 1, **ct. 10,** 96; Porch. Resourc. South., 206; Loudon Ency., 226; Am. Disp., 709; Gray Man., 111; Lindl. Flor. Med., 284; Allen Ency., 8, 378; Hale New Rem., 546; Torr. Bot. S. N. Y., 1, 130; Am. Hom. Phar., 392.

Rhus Toxicodendron, 38.

New Rem., 1880, 370: 2, 208; Med. Counsellor, 516, 522; Bot. Gaz., 1880, 42: 1879, 211, 219: 1878, 53; Hamilt. Flor. Hom., 2, **ct. 51,** 130; Bigel. Am. Med. Bot., 3, **ct. 42** (Radicans?), 19; Williams Med. Bot. Mass., 911; Darl. Am. Weeds, **f. 60,** 80; Porch. Resourc. South., 200, 201, 273; Wigand, 198; Park Derm. Ven.; Ludon Ency., **f. 3801,** 226; New Rem., 1879, 199, 240; Mich. Man. Weeds, 16; Griff. Med. Bot, 372; Hale New Rem., 506; Jour. Mat. Med., 3, 402; Am. Hom. Phar., 390; Wats. Bib., 183; Torr. Bot. S. N. Y., 1, 130; U. S. Phar., 283; Am. Disp., 709; Allen Ency., 8, 330.

Rhus aromatica, 39.

Am. Nat., 12, 597; Am. Jour. Phar., 1881, 209; Loudon Ency., 226; Am. Hom. Phar., 183; Wats. Bib., 181; Torr. Bot. S. N. Y., 1, 131.

Ampelopsis quinquefolia, 40.

Bot. Gaz., 1883, 201; Torr. Bot. S. N. Y., 1, 148; Darl. Am. Weeds, **ff. 65, lf. 64,** 85; Loudon Ency., **f. 2868,** 176; Gray Man., 113; Am. Hom. Phar., 75; Allen Ency., 10, 290; Am. Disp., 100; Clapp Cat., 759.

Rhamnus catharticus, 41.

Am. Jour. Phar., 1885, 496; Torr. Bot. S. N. Y., 1, 143; Am. Disp., 697; Fluck. and Han., 157; Flora Med., **ct. 129,** 128; Bent. and Trim., 1, **ct. 64**; Lindl. Med. Bot., **f. 234,** 164; Woodv. Med. Bot., 3, **t. 210,** 593; Darl. Am. Weeds, 86; Loudon Ency., **f. 2874,** 176; Gray Man., 114; Allen Ency., 8, 301; Griff. Med. Bot., 216; Lindl. Flor. Med., 167; Clapp Cat., 758.

Euonymus atropurpureus, 42.

Torr. Bot. S. N. Y., 1, 141; Gray Man., 116; Am. Hom. Phar., 293, 214; Wats. Bib., 162; U. S. Phar., 99; Clapp Cat., 758; Am. Jour. Phar., 1883, 367; Therap. Gaz., 1885, 39; Griff. Med. Bot. **f. 112,** 219; Ludon Ency., 178; New Rem., 1880, 80; Raf. Med. Flor., 1, 195; Jour. Mat. Med., 2, 406.

Æsculus Hippocastanum, 43.

Griff. Med. Bot., **f. 109,** 212; Raf. Med. Flor., 2, 219; Flor. Med., 1, **ct. 44,** 113; Lindl. Med. Bot., **f. 152,** 102; Gray Man., 117; Woodv. Med. Bot., 3, **t. 217,** 614; Darl. Am. Weeds, 88; Torr. Bot. S. N. Y., 1, 138; Allen Ency., 1, 48; Am. Hom. Phar., 57; Lindl. Flor. Med., 124; Hale New Rem., 20; Fluck. and Han., 541; U. S. Ag. Rept., 1870, 405; Dugl. New Rem., 269; Ludon Ency., **f. 5057,** 296; Am. Disp., 69; Chem. Carb. Comp., 461, 465; Tomp. Org. Chem., 809; Wittstein, 6, 84, 201.

Æsculus glabra, 44.

Ludon Ency., 296; Am. Hom. Phar., 57; Allen Ency., 1, 48; Gray Man., 118; Wats., Bib., 178; Hale New Rem., 19.

Polygala Senega, 45.

Flor. Med., 2, **ct. 106,** 62; Hamilt. Flor. Hom., 2, **ct. 58,** 176; Bigel. Am. Med. Bot., 2, **ct. 30**, 97; Bent. and Trim., 1, **ct. 29**; Lindl. Med. Bot., **f. 148**, 100; Woodv. Med. Bot., **t. 162**, 452; Darl. Am. Weeds, 92; Porch. Resourc. South., 85; Wiegand, **rf.** 43; Bart. Med. Bot., 2, **ct. 36**, 113; Loudon Ency., **f. 10005**, 602; Jour. Mat. Med., 1, 237; Gray Man., 122; Clapp. Cat., 760; Tomp. Org. Chem., 820; Am. Disp., 659; Raf. Med. Flor., 2, 64; Lindl. Flor. Med., 125; Griff. Med. Bot., **f. 114**, 225; Am. Hom. Phar., 409; Hughes Phar., 693; U. S. Phar., 291; Fluck. and Han., 77; Torr. Bot. S. N. Y., 1, 151; Allen Ency., 8, 586.

Genista tinctoria, 46.

Raf. Med. Flor., 2, 223; Darl. Am. Weeds, 96; Wigand, **ffol.**, 197; Loudon Ency., 610; Gray Man., 126; Lindl. Flor. Med., 238; Wats. Bib., 221; Torr. Bot. S. N. Y., 1, 185; Allen Ency., 4, 403.

Trifolium pratense, 47.

Am. Jour. Phar., 1883, 194; Darl. Am. Weeds, **ff. 74–5**, 97; U. S. Agric. Rept., 1864, 322: 1880, 151; Porch. Resourc. South., 177; Loudon Ency., **f. 10802**, 642; Torr. Bot. S. N. Y., 1, 168; Am. Disp., 832; Gray Man., 127; Allen Ency., 10, 22; Am. Hom. Phar., 441; Wats. Bib., 265.

Trifolium repens, 48.

Williams Med. Bot. Mass., 886; Darl. Am. Weeds, 98; Porch. Resourc. South, 177; Ludon Ency., **f. 10787**, 640; Torr. Bot. S. N. Y., 1, 169; Gray Man., 127; Allen Ency., 10, 22; Wats. Bib., 266.

Melilotus officinalis, 49.

Williams Med. Bot. Mass., 886; Darl. Am. Weeds, 299; Porch. Resourc. South., 176; Ludon Ency., **f. 10771**, 640; Gray Man., 128; Allen Ency., 6, 176; Am. Disp., 832; Griff. Med. Bot., 231; Am. Hom. Phar., 304–5; Torr. Bot. S. N. Y., 1, 170.

Robinia Pseudacacia, 50.

Am. Nat., 12, 6; Raf. Med. Flor., 2, 258; Darl. Am. Weeds, 101; Porch. Resourc. South., 188; Loudon Ency., **f. 10460**, 626; Gray Man., 131; Allen Ency., 10, 628; Am. Disp., 712; Griff. Med. Bot., 238; Am. Hom. Phar., 392; Clapp Cat., 761; Torr. Bot. S. N. Y., 1, 165.

Phaseolus vulgaris, 51.

Bot. Gaz., 1883, 194; Raf. Med. Flor., 2, 251; Darl. Am. Weeds, 107; U. S. Agric. Rep., 1870, 422; Ludon Ency., 614; Thom. Org. Chem., 887; Allen Ency., 7, 334; Wittstein, 112, 171; Chem. Carb. Comp., 492; Allen Ency., 7, 334.

Baptisia tinctoria, 52.

Am. Jour. Phar., 1879, 577; Bot. Gaz., 1880, 94; New Rem., 1879, 143; Griff. Med. Bot., **f. 119**, 231; Raf. Med. Flor., **f. 14**, 79; Darl. Am. Weeds, 108; Porch. Resourc. South., 175; Gray Man., 143; Torr. Bot. S. N. Y., 1, 187; Allen Ency., 2, 31; Am. Hom. Phar., 114; King Am. Disp., 160; Porch. Pl. S. C., 739; Clapp Cat., 761; Lindl. Flor. Med., 237; Bart. Med. Bot., 2, **ct. 29**, 53; Wats. Bib., 205; Am. Disp., 154; Ludon Ency., **f. 5691**, 342.

Gymnocladus Canadensis, 53.

Bull. Torr. Club., 1882, 130; Raf. Med. Flor., 2, 226; Darl. Am. Weeds, 110; Loudon Ency., **f. 13987**, 842; Am. Disp., 407; Gray Man., 145; Allen Ency., 4, 519; Am. Hom. Phar., 243; Wats. Bib., 222; Hale New Rem., 336; Torr. Bot. S. N. Y., 1, 191.

Geum Rivale, 54.

Darl. Am. Weeds, **f. 82**, 121; Torr. Bot. S. N. Y., 1, 203; Lindl. Med. Bot., 185; Raf. Med. Flor., 1, 221; Lindl. Flor. Med., 226; Gray Man., 152; Am. Disp., 387; Wats. Bib., 384; Loudon Ency., **f. 7626**, 454.

Fragaria vesca, 55.

Griff. Med. Bot., **f. 140**, 277; Raf. Med. Flor., 1, **f. 38**, 189; Williams Med. Bot. Mass., 884; Darl. Am. Weeds, **f. 83**, 123; Porch. Resourc. South., 144; Gray Man., 156; Torr. Bot. S. N. Y., 1, 212; Allen Ency., 4, 365; Wats. Bib., 282; Porch. Pl. S. C., 733; Am. Hom. Phar., 229; Lindl. Med. Bot., 184; Gray Bot. Text., **f. 677–9**, 412; Am. Disp., 365; U. S. Agric. Rept., 1870; Loudon Ency., **f. 7566**, 452.

Pirus Americana, 56.

Darl. Am. Weeds, 134; Porch. Resourc. South., 167; Torr. Bot. S. N Y, 1, 224; Gray Man., 161; Allen Ency., 10, 623; Am. Hom. Phar., 383; Raf. Med. Flor., 2, 265; Griff. Med. Bot., 293; Lindl. Flor. Med., 234; Clapp Cat., 769; Lindl. Med. Bot., 183.

Penthorum sedoides, 57.

Loudon Ency., **f. 6460**, 384; Torr. Bot. S. N. Y., 1, 253; Am. Hom. Phar., 361; Am. Disp. Suppl., 119; Allen Ency., 7, 301; Gray Man., 171.

Hamamelis Virginiana, 58.

Griff. Med. Bot., **f. 165**, 351; Raf. Med. Flor., 1, **f. 45**, 227; Williams Med. Bot. Mass., 882; Darl. Am. Weeds, 144; Porch. Resourc. South., 58; Ludon Ency., **f. 1814**, 104; Gray Man., 173; Torr. Bot. S. N. Y., 1, 270; Wats. Bib., 355; Am. Disp., 411; U. S. Phar., 124, 174; Am. Hom. Phar., 244; Allen Ency., 4, 528; Clapp Cat., 775.

Epilobium palustre, 59.

Wats. Bib., 366; Gray Man., 177; Am. Disp., 340; Loudon Ency., **f. 5487**, 320; Torr. Bot. S. N. Y., 1, 233; Chap. Bot., 140; Wood Bot., 351; Allen Ency., 4, 204.

Œnothera biennis, 60.

Raf. Med. Flor., 2, 247; Darl. Am. Weeds, 136; Porch. Resourc. South., 55; Gray Man, 178; Torr. Bot. S. N. Y., 1, 234; Allen Ency., 7, 137; Am. Hom. Phar., 346; Griff. Med. Bot., 304; Porch. Pl. S. C., 706; Clapp Cat., 771; King Am. Disp., 633; Hale New Rem., 446; Barton Flora, **t. 6**, 21; Am. Homœopath, 1883, 317; Wats. Bib., 377; Loudon Ency., 318.

Opuntia vulgaris, 61.

Am. Jour. Phar., 1884, 3; Bull. Torr. Club, 1883, 79; Raf. Med. Flor., 2, 247; Lindl. Med. Bot., **f. 237**, 244; Porch. Resourc. South., 66; Gray Man., 185; Allen Ency., 7, 237; Loudon Ency., **f. 6884**, 412; Am. Hom. Phar., 353; Torr. Bot. S. N. Y., 1, 245.

Eryngium yuccæfolium, 62.

Raf. Med. Flor., 2, 218; Porch. Resourc. South., 43; Allen Ency., 4, 213; Gray Man., 100; Hale New Rem., 290; Am. Hom. Phar., 212; Clapp Cat., 776; Am. Disp., 345; Wood Bot., 378; Griff. Med. Bot., 315; Chap. Bot., 160.

Pastinaca sativa, 63.

Raf. Med. Flor., 2, 251; Lindl. Med. Bot., **f. 348**, 254; Darl. Am. Weeds, 147; Loudon Ency., **f. 3724**, 222; Gray Man., 191; Allen Ency., 7, 291; Torr. Bot. S. N. Y., 1, 278.

Archangelica atropurpurea, 64.

Am. Jour. Phar., 1883, 469: 1882, 159: 1885, 339; Griff. Med. Bot., 322; Raf. Med. Flor., 2, 192; Torr. Bot. S. N. Y., 1, 276; Loudon Ency., 221; Man. Weeds, 26; Allen Ency., 1, 344; Gray Man., 193; Am. Disp., 111.

Æthusa Cynapium, 65.

Spratt Tox., 78; Church. Med. Bot., **ct. 8**; Hamilt. Flor. Hom., 1, **ct. 2**, 15; Bent. and Trim., 2, **ct. 125**; Lindl. Med. Bot., **f. 333**, 247; Torr. Bot. S. N. Y., 1, 274; Darl. Am. Weeds, **sf. 23–5**, 151; Loudon Ency., **f. 3666**, 218; Man. Weeds, 28; Am. Hom. Phar. 58; Clapp Cat., 778; Allen Ency., 1, 59; Wittstein, 63; Taylor Tox., 711; Lindl. Flor. Med., 40; Gray Man., 193; Wood Bot., 386.

Thaspium aureum, 66

Gray Man., 194; Allen Ency., 10, 234; Wats. Bib., 433; Torr .Bot. S. N. Y., 1, 271; Hale New Rem., 616; Raf. Med. Flor., 2, 267.

Cicuta maculata, 67.

Am. Jour. Phar., 1882, 491; Griff. Med. Bot., **f. 154**, 316; Raf. Med. Flor., 1, **f. 22**, 107: 2, 209; Bigel. Am. Med. Bot., 1, **ct. 12**, 125; Darl. Am. Weeds, **sf. 106–7**, 152; Porch. Resourc. South., 44; Loudon Ency., **f. 3608**, 216; Man. Weeds, 29; Biegl. Am. Med. Bot., 4, 181; Allen Ency., 3, 281; Gray Man., 196; Wats. Bib., 416; Clapp Cat., 778; Torr. Bot. S. N. Y., 1, 267.

Conium maculatum, 68.

Am. Journ. Phar., 1882, 359; 1885, 247; Bull. Torr. Club, 1881, 9; Griff. Med. Bot., **f. 160**, 339; Spratt, Tox., **cf. 24**, 44; Church. Med. Bot., **ct. 13**; Griff. Med. Bot., **f. 160**, 339; Raf. Med. Flor., 1, **f. 25**, 118; Flora Med., 1, **ct. 53**, 143; Hamilt. Flor. Hom., 1, **ct. 26**, 219; Bigel. Am. Med. Bot., 1, **ct. 11**, 113; Bent. and Trim., 2, **ct. 118**; Lindl. Med. Bot., **f. 232**, 247; Woodv. Med. Bot., 1, **t. 42**, 104; Darl. Am. Weeds, **f. 108–11**, 154; Wiegand, 211; Loudon Ency., **f. 3609**, 216; Am. Hom. Phar., 187; Clapp Cat., 779; U. S., Phar., 85; Lindl. Flor. Med., 57; Gray Man., 197; Chem. Carb. Comp., 470; Wittstein, 55–6; Am. Disp., 283; Fluck. and Han., 299; Taylor Tox., 698; Hughes Phar., 317; Man. Weeds, 29; Jour. Mat. Med., 4, 49; Allen Ency., 3, 519.

Aralia racemosa, 69.

Bot. Gaz., 1882, 122; Torr. Bot. S. N. Y., 1, 284; Gray Man., 198; Williams Med. Bot. Mass., 870; Porch. Resourc. South., 51; Griff. Med. Bot., 346; Gray Bot., 425; Loudon Ency., 230; Wats. Bib., 436; Hale New Rem., 53; Am. Disp., 124; Clapp Cat., 779; Raf. Med. Flor., 2, 195; Darl. Am. Weeds, 156; Am. Hom. Phar., 90; Allen Ency., 10, 323.

Aralia quinquefolia, 70.

Griff. Med. Bot., **f. 162**, 342, 344; Raf. Flor. Med., 2, **f. 71**, 52; Bigel. Am. Med. Bot., 2, **ct. 29**, 82; Bart. Med. Bot., 2, **ct. 45**, 191; Woodv. Med. Bot., 1, **t. 58**, 149; Williams Med. Bot. Mass., 870; Darl. Am. Weeds, 156; Porch. Resourc. South., 48; Loudon Ency., **f. 14391**, 872; New Rem., 1880, 227; Gray Man., 199; Allen Ency., 4, 415; Torr. Bot. S. N. Y., 1, 286; Clapp Cat., 781; Am. Disp., 596; Lindl. Flor. Med., 59; Wittstein, 166; Am. Hom. Phar., 234.

Cornus florida, 71.

Am. Jour. Phar., 1879, 390; Bull. Torr. Club, 1880, 121; Jour. Mat. Med., 3, 284: 1, 294: 4, 40; Griff. Med. Bot., **f. 164**, 347; Raf. Flor. Med., 1, **f. 28**, 131; Bigel. Am. Med. Bot., 2 **ct. 28**, 73; Bent. and Trim., 2, **ct. 126**; Williams Med. Bot. Mass., 910; Darl. Am. Weeds, **f. 112–13**, 158; Porch. Resourc. South., 59; Bart. Med., **ct. 3**, 43; Loudon Ency., **f. 1793**, 102; Am. Disp., 298; U. S. Phar., 87; Allen Ency., 10, 492; Hale New Rem., 242; Am. Hom. Phar., 191; Torr. Bot. S. N. Y., 1, 290; Wats. Bib., 439; Gray Man., 200; Lindl. Flor. Med., 81; Gray Bot., 425; Lindl. Med. Bot., 259; Wittstein, 59; Chap. Bot., 168.

Cornus circinata, 72.

Am. Journ. Phar., 1880, 433; Raf. Med. Flor., 1, 135; Griff. Med. Bot., 139; Loudon

Ency., **f. 1798,** 102; Wats. Bib., 438; Gray Man., 200; Torr. Bot. S. N. Y., 1, 289; Am. Hom. Phar., 191; Hale New Rem., 243; Am. Disp., 297; Allen Ency., 3, 565.

Cornus sericea, 73.

Raf. Med. Flor., 1, 135: 2, 213; Griff. Med. Bot., 349; Porch. Resourc. South., 62; Bart. Med. Bot., **ct. 9,** 115; Am. Journ. Phar., 1884, 618; Good Bot., **ct. 19;** Loudon Ency., **f. 1797,** 102; Gray Man., 200; Am. Disp., 299; Torr. Bot. S. N. Y., 1, 290; Clapp Cat., 782; Allen Ency., 10, 493; Am. Hom. Phar., 192.

Triosteum perfoliatum, 74.

Raf. Med. Flor., 2, 269; Bigel. Am. Med. Bot., 1, **ct. 9,** 90; 4, 181; Williams Med. Bot. Mass., 911; Darl. Am. Weeds, 161; Porch. Resourc. South., 407; Bart. Med. Bot., **ct. 4,** 59; Loudon Ency., **f. 2802,** 170; Gray Man., 205; Gray Flor. N. A., 12; Torr. Bot. S. N. Y., 1, 301; Am. Disp., 834; Allen Ency., 10, 25; Griff. Med. Bot., 352; Lindl. Flor. Med., 445; U. S. Phar., 446; Am. Hom. Phar., 443.

Sambucus Canadensis, 75.

Am. Jour. Phar., 1881, 382, 553; Raf. Med. Flor., 2, 260; Bent. and Trim., 2, **ct. 138;** Darl. Am. Weeds, 162; Porch. Resourc. South., 408; Good Bot., **ct. 39;** Loudon Ency., **f. 3731,** 224; Gray Flor. N. A., 9; Allen Ency., 8, 476; Chap. Bot., 171; Gray Man., 205; Am. Disp., 740; Torr. Bot. S. N. Y., 1, 303; Fluck. and Han., 334; Am. Hom. Phar., 399; U. S. Phar., 787.

Cephalanthus occidentalis, 76.

Griff. Med. Bot., **f. 169,** 356; Raf. Med. Flor., 1, **f. 20,** 100; Williams Med. Bot. Mass., 910; Porch. Resourc. South., 405; Gray Bot. Text., **f. 751–3,** 430; Gray Man., 211; Allen Ency., 10, 456; Torr. Bot. S. N. Y., 1, 313; Porch. Pl. S. C., 788; Clapp Cat., 788; King Am. Disp., 214; Am. Hom. Phar., 159; Am. Disp., 205; Loudon Ency., **f. 1677,** 96.

Mitchella repens, 77.

Allen Ency., 6, 373; Am. Hom. Phar., 320; Porch. Pl. S. C., 788; Clapp Cat., 788; King Am. Disp., 600; Hale New Rem., 441; Raf. Med. Flor., 2, 243; Loudon Ency., **f. 1758,** 100; Bull. Torr. Club, 1883, 1; Williams Med. Bot. Mass., 910; Porch. Resourc. South., 405; Gray Man., 201; Torr. Bot. S. N. Y., 1, 314.

Eupatorium purpureum, 78.

Raf. Med. Flor., 1, 179; Williams Med. Bot. Mass., 874; Porch. Resourc. South., 412; Loudon Encyc., 688; Porch. Pl. S. C., 790; Am. Disp., 351; Gray Flora N. A., 95; Gray Man., 225; Am. Hom. Phar., 216; Torr. Bot. S. N. Y., 1, 326; Allen Ency., 4, 237.

Eupatorium perfoliatum, 79.

Torr. Bot. S. N. Y., 1, 329; Am. Disp., 350; Gray Flora N. A., 99; Am. Hom. Phar., 215; Porch. Resourc. South., 410; Lindl. Flor. Med., 451; U. S. Phar., 99; Am. Jour. Phar., 1880, 392: 1879, 342; Griff. Med. Bot., **f. 180,** 390; Raf. Med. Flor., 1, **f. 36,** 174; Bigel. Am. Med. Bot., 1, **t. 2,** 33; Bart. Med. Bot., 2, **ct. 37,** 125; Bent. and Trim., 3, **ct. 147;** Darl. Am. Weeds, 170; Loudon Ency., **f. 11536,** 688; Man. Weeds, 35; Jour. Mat. Med., 2, 243; 241; Hale New Rem., 294; Gray Man., 226; Torr. Bot. S. N. Y., 1, 329; Allen Ency., 4, 234.

Erigeron Canadense, 80.

Am. Jour. Phar., 1883, 372; Raf. Med. Flor., 2, 218; Bent. and Trim., 3, **ct. 149;** Darl. Am. Weeds, **f. 116–17,** 192; Porch. Resourc. South., 415–16; Am. Jour. Phar., 1884, 619; Loudon Ency., 704; Allen Ency., 4, 211; Gray Man, 236; Gray Flora N. A., 221; Torr. Bot. S. N. Y., 1, 353; Am. Disp., 343; Am. Hom. Phar., 211; U. S. Phar., 236.

Inula Helenium, 81.

Am. Jour. Phar., 1881, 469; Raf. Med. Flor., 2, 231; Flor. Med., 1, **ct. 40,** 106; Strong Am. Flor., 1, **ct. 19,** 43; Bent. and Trim., 3, **ct. 150;** Woodv. Med. Bot., 1, **t. 26,** 64; Williams Med. Bot. Mass., 896; Darl. Am. Weeds, 176; Porch. Resourc. South., 417; Wiegand, 68; Loudon Ency., **f. 12147,** 714; Allen Ency., 5, 112; Am. Disp., 444; Wittstein, 104, 112; Gray Man., 246; U. S. Phar., 185; Am. Hom. Phar., 255.

Ambrosia artemisiæfolia, 82.

Am. Jour. Phar., 1885, 341; Allen Ency., 10, 285; Gray Flor. N. A., 249; Gray Man., 251; Am. Hom. Phar., 470; Raf. Med. Flor., 2, 190; New Rem., 1879, 239; Torr. Bot. S. N. Y., 1, 376; Porch. Resourc. South., 419.

Helianthus annuus, 83.

Raf. Med. Flor., 2, 226; Darl. Am. Weeds, 181; Porch. Resourc. South., 422; Loudon Ency., 730; Am. Hom. Phar., 246; Gray Man., 255; Wittstein, 104; Am. Disp., 416; Allen Ency., 4, 545; Gray Flora N. A., 272.

Anthemis nobilis, 84.

Griff. Med. Bot., **f. 184,** 404; Flor. Med., 1, **ct. 28,** 73; Strong Am. Flor., 1, **cf. 55,** 119; Bent. and Trim., 3, **ct. 154;** Lindl. Med. Bot., **f. 310,** 231; Woodv. Med. Bot., 1, **t. 19,** 47; Loudon Ency., **f. 12324,** 724; Allen Ency., 1, 358; Am. Hom. Phar., 81; Lindl. Flor. Med., 59; Wood Bot., 457; Gray Man., 265; Gray Flora N. A., 363; Fluck. and Han., 384; Chem. Carb. Comp., 269; Wittstein, 141; U. S. Phar., 37; Am. Disp., 112.

Achillea Millefolium, 85.

Am. Nat., 12, 651; Griff. Med. Bot., 403; Raf. Med. Flor., 2, 185; Bent. and Trim., 3, **ct. 153;** Lindl. Med. Bot., **ff. 306,** 229; Torr.

Bot. S. N. Y., 1, 392; Woodv. Med. Bot., 1, **t. 15,** 36; Williams Med. Bot. Mass., 896; Darl. Am. Weeds, 187; Porch. Resourc. South., 424; Loudon Ency., 726; Am. Disp., 25; Wittstein, 3, 140; Chem. Carb. Comp., 487; Am. Hom. Phar., 319; Clapp Cat., 800; Allen Ency., 6, 366; Gray Flora N. A., 363; Gray Man., 265.

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Am. Jour. Phar., 1882, 288, 493; Am. Nat., 13, 572; Raf. Med. Flor., 2, 266; Flor. Med., 2, **ct. 131,** 132; Woodv. Med. Bot., 1, **t. 27,** 66; Williams Med. Bot. Mass., 896; Porch. Resourc. South., 425; London Ency., **f. 11680,** 696; Therap. Gaz., 1885, 215, 342; Allen Ency., 9, 503; Gray Man., 266; Clapp Cat., 800; Gray Flora N. A., 366; Torr. Bot. S. N. Y., 1, 393; Chap. Bot., 242; Wood Bot., 458; Lindl. Flor. Med., 464; Lindl. Med. Bot., 229; Thom. Org. Chem., 478; Am. Disp., 823; U. S. Phar., 331; Am. Hom. Phar., 432; Griff. Med. Bot., 406.

Artemisia vulgaris, 87.

Griff. Med. Bot., 406; Torr. Bot. S. N. Y., 1, 395; Woodv. Med. Bot., 1, **t. 23,** 57; Wiegand **rf.** 71; Loudon Ency., 698; Am. Hom. Phar., 101; Gray Man., 267; Allen Ency., 1, 558; Gray Flora N. A., 372.

Artemisia Absinthium, 88.

Griff. Med. Bot., 405; Raf. Med. Flor., 2, 183; Flor. Med., 1, **cf. 38,** 96; Bent. and Trim., 3, **ct. 156**; Lindl. Med. Bot., **f. 308,** 230; Woodv. Med. Bot., **t. 22,** 54; Am. Jour. Phar., 1882, 310; New Rem., 11, 64; Darl. Am. Weeds, 190; Williams Med. Bot. Mass., 895; Loudon Ency., 698; Therap. Gaz., 1886, 239; Taylor Tox., 651; Allen Ency., 1, 2; 10, 242; Clapp Cat., 802; Gray Man., 267; Am. Hom. Phar., 31; U. S. Phar., 1; Wittstein, 2; Chem. Carb. Comp., 218; Lindl. Flor. Med., 464; Am. Disp., 135; Thom. Org. Chem., 864; Gray Flora N. A., 370.

Gnaphalium polycephalum, 89.

Raf. Med. Flor., 2, 224; Williams Med. Bot. Mass., 894; Darl. Am. Weeds, 191; Porch. Resourc. South., 426; Therap. Gaz., 1884, 547; Am. Hom. Phar., 237; Gray Flora N. A., 234; Am. Disp., 399; Allen Ency., 4, 456; Torr. Bot. S. N. Y., 1, 396; Gray Man., 268; Wood Bot., 461; Chap. Bot., 243; Hale New Rem., 331; Clapp Cat., 802.

Erechthites hieracifolia, 90.

Am. Jour. Phar., 1883, 372; 1885, 107; Darl. Am. Weeds, 191; Man. Weeds, 50; Hale New Rem., 278; Allen Ency., 4, 210; Am. Hom. Phar., 211; Am. Disp., 342; Chap. Bot., 244; Wood Bot., 462; Gray Man., 270; Gray Flora N. A., 398; Torr. Bot. S. N. Y., 1, 400; Clapp Cat., 803.

Senecio aureus, 91.

Raf. Med. Flor., 2, 262; Darl. Am. Weeds, 193; Porch. Resourc. South., 427; Torr. Bot. S. N. Y., 1, 402; Gray Man., 271; Allen Ency., 8, 582; Gray Flora N. A., 391; Am. Disp., 767; Hale New Rem., 578; Hughes Phar., 692; Am. Hom. Phar., 408; Clapp Cat., 803; Loudon Ency., 706.

Lappa officinalis, 92.

Raf. Med. Flor., 2, 195; Griff. Med. Bot., 411; Flor. Med., 2, **ct. 138,** 152; Strong Am. Flora, 1, **ct. 14,** 33; Lindl. Med. Bot., **f. 313,** 233; Woodv. Med. Bot., 1, **t. 13,** 32; Williams Med. Bot. Mass., 893; Darl. Am. Weeds, 209; Wiegand, **rf.** 73; Therap. Gaz., 1884, 552; Good Bot., **ct. 11**; Am. Jour. Phar., 1885, 127; Loudon Ency., **f. 11345,** 680; Man. Weeds, 59; Allen Ency., 10, 571; Hale New Rem., 55; Gray Flora N. A., 397; Gray Man., 275; Am. Disp., 126; Torr. Bot. S. N. Y., 1, 408; Am. Hom. Phar., 91; U. S. Phar., 189.

Cichorium Intybus, 93.

Raf. Flor. Med., 2, 208; Griff. Med. Bot., **ff. 179,** 388; Strong Am. Flora, 1, **cf. 44,** 95; Lindl. Med. Bot., **r.** and **ff. 314,** 235; Woodv. Med. Bot., 1, **t. 29,** 70; Darl. Am. Weeds, **f. 135–6,** 201; Porch. Resourc. South., 431; Wiegand, **rf.** 76; Loudon Ency., **f. 11336,** 678; Torr. Bot. S. N. Y., 1, 411; Am. Disp., 226; Clapp Cat., 805; Gray Man., 275; Gray Flora N. A., 412; Allen Ency., 3, 181.

Prenanthes Serpentaria, 94.

Am. Jour. Phar., 1886, 117; Am. Hom. Phar., 327; Allen Ency., 6, 444; Gray Man., 278; Torr. Bot. S. N. Y., 1, 415; Raf. Med. Flor., 2, 253; Gray Flora N. A., 434; Clapp Cat., 806; Wood Bot., 472; Chap. Bot., 251; Am. Disp., 543.

Taraxacum Dens-Leonis, 95.

Church. Med. Bot., **ct. 5**; Raf. Med. Flor., 2, **f. 58,** 18; Griff. Med. Bot., **f. 186,** 414; Flor. Med., 1, **ct. 23,** 59; Strong Am. Flora, **ct. 3,** 9; Hamilt. Flor. Hom., 2, **ct. 62,** 198; Bent. and Trim., 3, **ct. 159**; Woodv. Med. Bot., 1, **t. 16,** 39; Williams Med. Bot. Mass., 893; Porch. Pl. S. C., 799; Darl. Am. Weeds, **f. 137–40,** 204; Porch. Resourc. South., 428; Wiegand, **rf.** 75; Clapp Cat., 806; Gray Flora N. A., 440; Wittstein, 112; Chem. Carb. Comp., 278; Fluck. and Han., 392; Lindl. Med. Bot., 234; Darl. Ag. Bot., 99; Hughes Phar., 738; Allen Ency., 9, 539; Lindl. Flor. Med., 469; King Am. Disp., 928; Am. Disp., 824; Torr. Bot. S. N. Y., 1, 417; Gray Man., 280; U. S. Phar., 331; Am. Hom. Phar., 432; Loudon Ency., **f. 11154,** 690.

Lactuca Canadensis, 96.

Am. Jour. Phar., 1883, 593; Raf. Med. Flor., 2, 234; Bent. and Trim., 3, **ct. 160, 161**; Williams Med. Bot. Mass., 893; Darl. Am. Weeds, 205; Porch. Resourc. South., 435; Loudon Ency., 668; Wiegand, 230; Gray Man., 280; Torr. Bot. S. N. Y., 1, 418; Am. Disp., 472; Clapp Cat., 806; Thom. Org. Chem., 159, 587; Wittstein, 117; Fluck. and Han., 396; U. S. Phar., 189; Gray Flora N. A., 442; Allen Ency., 5, 487; Am. Hom. Phar., 285.

Lobelia cardinalis, 97.

Griff. Med. Bot., 420; Raf. Med. Flor., 2, 26; Bart. Med. Bot., 2, **ct. 43,** 178; Torr. Bot. S. N. Y., **ct. 64,** 425; Williams Med. Bot. Mass., 892; Darl. Am. Weeds, 207; Porch. Resourc. South., 404; Loudon Ency., 166; Allen Ency., 5, 609; Am. Hom. Phar., 292; Gray Flora, 3; Wood Bot., 476; Chap. Bot., 254; Lindl. Med. Bot., 224; Clapp Cat., 807; Am. Disp., 494; Hale New Rem., 416.

Lobelia syphilitica, 98.

Spratt Tox., **cf. 18,** 20; Griff. Med. Bot., 420; Raf. Flora Med., 2, 25; Strong Am. Flora, 1, **ct. 18,** 41; Bart. Med. Bot., 2, **ct. 47,** 207; Torr. Bot. S. N. Y., 1, **ct. 62**; Woodv. Med. Bot., 2, **t. 83,** 249; Porch. Resourc. South., 403; Lindl. Med. Bot., 224; Lindl. Flor. Med., 403; Clapp Cat., 807; Porch. Pl. S. C., 786; Gray Flora, 4; Loudon Ency., 166; Wood Bot., 476; Chap. Bot., 254; Allen Ency., 5, 618.

Lobelia inflata, 99.

Raf. Med. Bot., 2, **f. 60,** 22; Strong Am. Flora, 2, **ct. 7,** 15; Bigel. Am. Med. Bot., 1, **ct. 19,** 177; Bent. and Trim., 3, **ct. 162**; Lindl. Med. Bot., **f. 301,** 224; Torr. Bot. S. N. Y., **ct. 63,** 423; Williams Med. Bot. Mass., 892; Darl. Am. Weeds, **f. 141–3,** 206; Porch. Resourc. South., 401; Wiegand, 229; Bart. Mat. Med., **ct. 16,** 181; Loudon Ency., 166; Allen Ency., 5, 611; Gray Man., 283; Gray Flora, 7; Am. Disp., 491; Taylor Tox., 735; Griff. Med. Bot., **f. 188,** 418; Hale New Rem., 422; Fluck. and Han., 399; Wittstein, 122; U. S. Phar., 211; Hughes Phar., 503; Lindl. Flor. Med., 403; Wood Bot., 477; Chap. Bot., 254.

Arctostaphylos Uva-Ursi, 100.

Am. Jour. Phar., 1884, 51; 1885, 139; Griff. Med. Bot., **f. 191,** 425; Raf. Med. Flor., 1, **f. 9,** 57; Flor. Med., 1, **ct. 45,** 115; Bigel. Am. Med. Bot., 1, **ct. 6,** 67; Bent. and Trim., 3, **ct. 113**; Lindl. Med. Bot., **f. 158,** 106; Torr. Bot. S. N. Y., 430; Woodv. Med. Bot., 2, **t. 100,** 287; Williams Med. Bot. Mass., 915; Darl. Am. Weeds, 211; Wiegand, 229; Therap. Gaz., 1884, 553–4; Loudon Ency., **f. 5967,** 360; Therap. Gaz., 1885, 311; Jour. Mat. Med., 2, 224; 1, 137; Allen Ency., 10, 56; Am. Disp., 126; Lindl. Flor. Med., 382; Clapp Cat., 810; Gray Man., 293; Wood Bot., 486; Gray Flora, 27; U. S. Phar., 372; Fluck. and Han., 401; Am. Hom. Phar., 447; Wittstein, 16, 75, 76; Chem. Carb. Comp., 293, 340, 460, 465.

Epigæa repens, 101.

Hale New Rem., 278; Gray Flora, 29; Gray Man., 293; Am. Hom. Phar., 210; Am. Disp., 340; Clapp Cat., 811; Torr. Bot. S. N. Y., 1, 482; Wood Bot., 485; Chap. Bot., 261.

Gaultheria procumbens, 102.

Am. Jour. Phar., 1882, 49; 1879, 439; 1883, 197; Raf. Med. Flor., 1, **f. 40,** 202; Griff. Med. Bot., **f. 190,** 424; Raf. Med. Flor., 2, 222; Bigel. Am. Med. Bot., 2, **t. 22,** 27; Bent. and Trim., 3, **ct. 164**; Williams Med. Bot. Mass., 915; Darl. Am. Weeds, **f. 145,** 212; Porch. Resourc. South., 380; Barton Med. Bot., 1, **ct. 15,** 171; Loudon Ency., **f. 5962,** 360; Am. Disp., 377; Gray Man., 293; Gray Flora, 30; Torr. Bot. S. N. Y., 2, 433; Chem. Carb. Comp., 91, 368–9; Wittstein, 199; U. S. Phar., 168; Allen Ency., 4, 384; Wood Bot., 486; Chap. Bot., 261.

Kalmia latifolia, 103.

Griff. Med. Bot., **f. 192,** 428; Raf. Med. Flor., 2, **f. 57,** 16; Bigel. Am. Med. Bot., **ct. 13,** 133; Williams Med. Bot. Mass., 915; Darl. Am. Weeds, 214; Porch. Resourc. South., 381; Gray Flora, 38; Gray Man., 298; Torr. Bot. S. N. Y., 1, 440; Lindl. Flor. Med., 380; Clapp Cat., 813; King Am. Disp., 534; Chem. Carb. Comp., 51; Am. Hom. Phar., 279; Allen Ency., 5, 388; Lindl. Med. Bot., 107; Fluck. and Han., 402; Hughes Phar., 173; Am. Jour. Phar., 1884, 619; Loudon Ency., **f. 5915,** 356; Am. Disp., 465.

Chimaphila umbellata, 104.

Am. Disp., 214; Am. Hom. Phar., 165; U. S. Phar., 74; Gray Man., 303; Gray Flora, 45; Allen Ency., 3, 181; Clapp Cat., 815; Chap. Bot., 267; Wood Bot., 494; Griff. Med. Bot., **f. 189,** 421; Strong Am. Flora, **cf. 36,** 81; Bigel. Am. Med. Bot., 2, **ct. 21,** 15; Bent. and Trim., 3, **ct. 165**; Lindl. Med. Bot., **lf. 156**; Torr. Bot. S. N. Y., 1, **ct. 70,** 455; Darl. Am. Weeds, 215; Porch. Resourc. South., 378; Wiegand, 228; Barton Med. Bot., **ct. 1,** 13; Good Bot., **ct. 10.**

Monotropa uniflora, 105.

Bot. Gaz., 1878, 37, 53, 79; Raf. Med. Flor., 2, 243; Williams Med. Bot. Mass., 892; Porch. Resourc. South., 378; Loudon Ency., **f. 5911,** 356; Torr. Bot. S. N. Y., 1, 456; Chap. Bot., 268; Am. Disp., 530; Am. Hom. Phar., 321; Gray Flora, 49; Clapp Cat., 816; Gray Man., 304; Allen Ency., 10, 585.

Ilex verticillata, 106.

Raf. Med. Flor., 2, 253; Bigel. Am. Med. Bot., 3, **ct. 57,** 141; Williams Med. Bot. Mass., 913; Darl. Am. Weeds, 217; Barton Med. Bot., 1, **ct. 17**, 203; Good Bot., **ct. 14**; Loudon Ency., **f. 4916**, 286; Jour. Mat. Med., 1, 329; Allen Ency., 8, 155; Griff. Med. Bot., 434; Lindl. Flor. Med., 394; Lindl. Med. Bot., 193; U. S. Phar., 271; Am. Disp., 677; Torr. Bot. S. N. Y., 2, 3; Chap. Bot., 270; Wood Bot., 498; Gray Bot., 307; Brock. Essay, 160.

Plantago major, 107.

Sci. Am. Suppl., 1883, 6627; Woodv. Med. Bot., 1, **t. 33**, 81; Williams Med. Bot. Mass., 892; Darl. Am. Weeds, **f. 148**, 218; Porch. Resourc. South., 436; Loudon Ency., 96; Raf. Med. Flor., 2, 252; Am. Hom. Phar., 370; Hale New Rem., 497; Gray Bot. Text., 441; Lindl. Flor. Med., 473; Torr. Bot. S. N. Y., 2, 14; Gray Flora, 388; Am. Disp., 651; Fluck. and Han., 490; Clapp Cat., 820; Gray Man., 310.

Anagallis arvensis, 108.

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ADDITIONS AND CORRECTIONS.

As might be expected in a work issued in parts, and extending over a long period of time, many inequalities of treatment will be found. The following corrections are some of the more noticeable:

Page 14-2, line 15, for "*A. platyphyllus*," read *C. platyphyllus*.
" 15-2, " 2 from bottom, for "lava," read Clava.
" 23-2, " 21 for "Maritiima," read Maritima.
" 35-2, " 5, for "*Simarouba*," read *Simaruba*.
" 35-2, " 2 from bottom, the same correction.
" 41-3, foot-note, for "Rhamneitne," read Rhamnetine.
" 46-2, line 6, for "*Copiava*," read *Copaiva*.
" 46-2, " 20, for "*Cyticus*," read *Cytisus*.
" 46-3, " 19, for "*augustifolia*," read *angustifolia*.
" 46-3, " 28, for "*Psoralia*," read *Psoralea*.
" 49-2, " 16, for "*Dipterix*," read *Dipteryx*.
" 77, " 9, for "reeping," read Creeping.
" 85-2, " 24, for "Etsupra," read Et supra.
" 110-2, " 13 from bottom, for "emale," read female.
" 128-2, " 12 from bottom, for "*chinensis*," read *Chinensis*.
" 129-2, " 14, for "Centuary," read Centaury.
" 133, last foot-note is now unnecessary.
" 141, line 3 from bottom, for "*moorcroftianum*," read *Moorcroftianum*.
" 134-3, Description of Plate, for "A cluster of Follicles," read A follicle; and add, 5. A section of the root.
" 147-2, line 17, for "*cyparissias*," read *Cyparissias*.
" 160-3, " 19, for "cerefera," read cerifera.
" 164-2, foot-note, for "*Ut supra*," read *Et supra*.

Plate 66 should be titled THASPIUM AUREUM.
" 107, the spike of flowers is not broad enough; it should have been more fusiform. As it now is, the plate much more resembles *Plantago Rugelii* than *P. major*.
" 158, should be titled CASTANEA VESCA, VAR. AMERICANA.

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